# THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 38 NOVEMBER, 1935 No. 2

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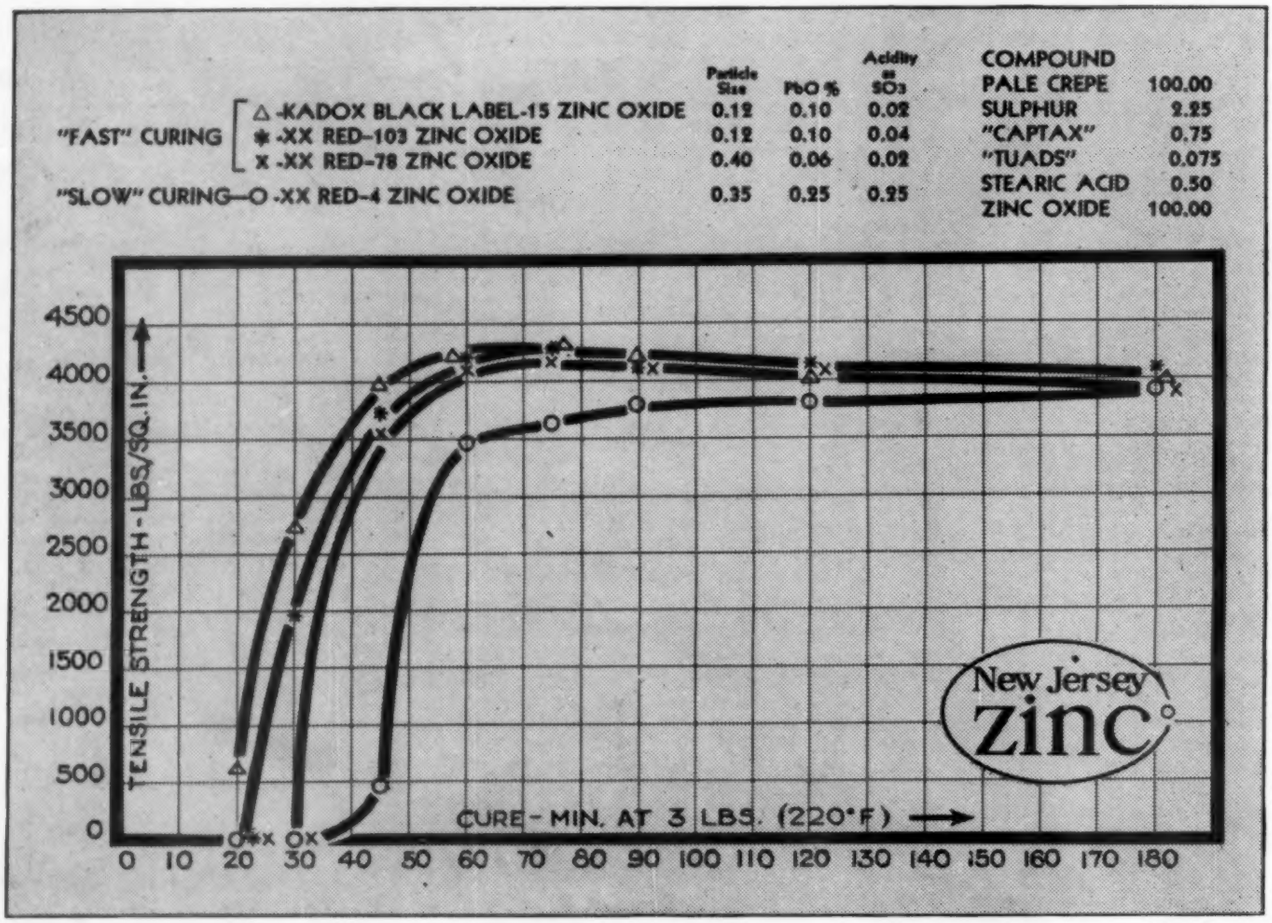
# "Fast" and "Slow" Curing Zinc Oxides with "Captax" and "Tuads"

**No. 44** of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.




With low temperature cures, the zinc oxides in this series of tests cure at a rate proportional to the particle size. **XX Red 4** shows additional retardation due to its acidity, which also gives rise to definite anti-scorch properties.

*(See also Chart No. 13 in* **The Activator***)*

**UNIFORM QUALITY ZINC OXIDES**

**THE NEW JERSEY ZINC COMPANY**

THE RUBBER AGE

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# Progress in X-Ray Research on Rubber

**By George L. Clark**
Professor of Chemistry, University of Illinois

**Discovery of a method by a group of collaborators, which included the author, making it possible to isolate individual uniform particles in cellulose, chitin, starch and proteins observable under a microscope and identified by x-ray analysis, resulted in the conclusion that molecular weights are of the order of 500,000. Additional collaboration with the National Bureau of Standards determined that the molecular weight of rubber was of the same order, although it has not yet been possible to completely and successfully isolate such particles as exist in these other natural materials. X-ray analysis of rubber during a series of tests revealed two new findings, i.e., a differentiation between sol rubber and gel rubber, and the discovery, by an entirely new technique, of a very large spacing in gel rubber absent in sol rubber. Important observations on rubber fractions and on measurements of large spacings have been made. The author herein reports current results. Final conclusions and definite announcements, when detemined, will be presented by Professor Clark in a future issue of THE RUBBER AGE.—(EDITOR.)**

FOLLOWING the original x-ray diffraction research on rubber several years ago in which it was demonstrated that stretched rubber produces a crystal fiber diffraction pattern, there has been relatively little addition to the knowledge of the structure of rubber from the x-ray analysts. In recent months, however, several interesting new possibilities have developed, and it is the purpose of this brief note to report progress in investigations on rubber in this laboratory which may yield new information of very considerable interest and importance even from the industrial point of view.

About a year ago it was discovered, in the course of collaborative microscopic and x-ray work, that uniform ellipsoidal particles between 1 and 1.5 microns in length could be isolated in cellulose, proteins, chitin, and starch. These particles are absolutely uniform for any one natural product and can be observed even in very young fibers or regained from mature fibers by disintegration of cementing layers of such substances as pectin in cellulose. The molecular weights of these natural products calculated upon the assumption that the molecules are just as long as the microscopically visible particles are astonishingly compatible with values obtained by supercentrifuge analysis and other methods. These methods have also indicated that rubber has a very high molecular weight. This would seem to indicate that there may pre-exist in rubber uniform particles of some type analogous to those which are so definitely disclosed in the other natural products referred to above.

We have not been successful in isolating such particles by preferential solution or removal of a dispersing and cementing substance. Whether these ellipsoidal particles exist in rubber is questionable, but the discovery of new large spacings in unstretched rubber reported in the subsequent paragraph gives some indication of a bundle or larger structural unit than has ever been observed and which is much larger than the unit crystal cell which was derived directly from the ordinary type of x-ray diffraction pattern for stretched rubber.

At the request of the late Dr. Washburn, a careful preliminary x-ray diffraction study has been completed on samples of rubber fractions prepared at the National Bureau of Standards by the methods already described.[1] The results are so interesting, especially in structural differentia-

[1] Washburn, *Phys. Rev.* **38**, 1790 (1931); Smith, Saylor and Wing, National Bureau of Standards *Journal of Research* 10, 479 (1933); Clark, Warren and Smith, *Science* **79**, 433 (1934).

tion between the ether-soluble (sol rubber) and the ether-insoluble (gel rubber) hydrocarbons, and in producing new data bearing upon the several theories of the structure of whole rubber, that it has seemed desirable to record very briefly some of the more important observations.

It will be recalled that native rubber, raw, purified or vulcanized, gives a typical liquid halo or "amorphous" type of diffraction pattern in the unstretched condition, which changes to the characteristic crystal fiber pattern when the rubber specimen is stretched. Upon the basis of these facts several theories of the structure of the rubber hydrocarbon have been proposed: the folded or spiral molecules model; the fringe model (bundles of molecular chains with frayed ends); the flexible chain model; and the very familiar two-phase model.

### New Observations on Rubber Fractions

The important new observations on the fractions are as follows: (1) The purified total hydrocarbon behaves on stretching exactly as previously found for rubber.

(2) The sol-rubber fraction produces no evidence whatever of the characteristic crystal fiber pattern upon stretching even up to 1000 per cent. The liquid halo is retained under all conditions, but it becomes *broader* in proportion as the percentage of stretch increases (which may be due to decreasing particle size). The same results are observed in the presence or absence of antioxidants.

(3) The gel-rubber fraction produces easily, above 100 per cent. elongation, the crystal fiber pattern, which is quite sharp and intense for 200 per cent. stretch. The liquid halo remains unchanged in width and decreases in intensity as the crystal interferences increase in intensity. When, however, antioxidants are removed and the sheet is allowed to stand without vulcanization, it is difficult to find crystal interferences even at 400 per cent. elongation.

(4) The sol-rubber *when vulcanized* begins to show faint evidence of crystal interferences when stretched above 400 per cent., showing that sulfur has produced a profound structural effect. Vulcanization was accomplished by the Peachey (vapor cure) method.

(5) The gel-rubber, vulcanized, gives a fiber pattern at 250 per cent. elongation.

The next phase of the investigation of rubber is concerned with the technique and measurements of very large spacings[2] unknown previously because of failure to resolve the corresponding interferences on x-ray diffraction patterns photographed by ordinary technique.

In the course of a very comprehensive study of the structure of living nerve[3] a very refined x-ray technique was developed whereby it was possible to measure accurately very large spacings, one of which is 171 A.U. for the length of lipoid molecules radially oriented in the myelin sheath. By ordinary x-ray diffraction technique interferences corresponding to such spacings down to about 20 A.U. are not resolved from the blackening of the photographic film due to the undeflected primary x-ray beam. Recourse must be taken, therefore, to the following procedures:

(1) With a given primary x-ray wave length, usually the K$\alpha$ of copper, decrease pinhole sizes to 0.005 inch, increase specimen to film distances from 5 cm. usually employed to 20-30 cm., filter the x-ray beam with nickel foil to remove all beam components except the K$\alpha$ and center very small lead beads with extraordinary care over the point of impingence on the film of the unabsorbed primary beam; (2) increase the x-ray wave length $\lambda$ by the use of magnesium or aluminum targets, since sin $\theta$ ($2\theta$ = diffraction angle) increases with the value of $\lambda$ for a given spacing.

We have succeeded in improving the technique of both methods to such an extent that definite and reproducible results are obtained on unsuspected large spacings. In addition to the nerve spacing mentioned above, a very large periodicity of 440 A.U. along the fiber axis, and one of 49.4 A.U. literally, are found in catgut or collagen, a lateral spacing of 81 A.U. in keratin, and the most interesting differentiation of all for rubber.

For the fraction of rubber insoluble in ether, a well defined ring corresponding to a spacing of 58 A.U. is clearly produced for an unstretched specimen. This ring segments into equatorial sickles on stretching indicating, of course, that a fundamental side-wise spacing of 58 A.U. exists in the structure of unstretched rubber which persists, with the expected fibering, in the process of stretching. Sol rubber, on the other hand, gives no indication whatsoever of any large spacing or of any diffraction interference at smaller angles than those which have been previously observed by the ordinary technique.

It would be unsafe at this time to try to derive a complete structural picture of the gel phase of rubber upon the basis of this very definite discovery. Certainly it does indicate some type of structural periodicity pre-existent in unstretched rubber. This spacing and, of course, the x-ray interferences are easily affected by milling, oxidation, heat treatment, and chemical attack upon the gel rubber, just as the 49.4 spacing in catgut is completely removed by simple sterilization at 105° C. Obviously, considerably further careful research work, which is now in progress, will be required to give the complete significance to this definite and valuable clue.

### X-Ray Experiments Being Continued

The technique of examining crystals of rubber, as prepared by our collaborator, W. H. Smith, at the National Bureau of Standards, by x-ray methods at the low temperatures required and with the minute amounts of material, is one of extreme difficulty and a new attack upon the whole problem is now being made with improved apparatus constructed upon the basis of experience which has been gained. One of the complications, of course, is the swelling and distortion of the minute clusters of crystals by the solvent used to protect them.

Experiments with long wave-length x-rays will continue in an investigation of these crystals until satisfactory reproducible results have been obtained. A few films with definite indications of crystal diffraction spots at random already have been photographed. These indicate crystallinity but are insufficient for structure analysis. Incidentally, if the length of one of the individual crystal rodlets in the nodules is assumed to be the length of a rubber hydrocarbon molecule, the value for the molecular weight of such a long chain calculated upon this basis agrees very favorably with the high values obtained by the supercentrifuge and viscosity methods. Whether or not this assumption is justified remains to be seen. Definite results will be reported later subject to approval by the Director of the National Bureau of Standards.

[2] Clark, Parker, Schaad and Warren, *J. Am. Chem. Soc.* 57, 1509 (1935).
[3] *Radiology*, 25, 131 (1935).

# Latex Comes of Age

## A Summary of the Rapid Advance in the Use of Latex Together with a Review of Its Manufacturing Problems

By M. P. Williams

**This article is a general review of the more important strides taken by latex in rubber manufacturing in the past few years. The author discusses several factors of importance to manufacturers who contemplate the use of latex. These factors include the advantages and disadvantages of latex, selection of production method (electrodeposition, spraying or immersion, etc.). Only brief mention is made of the actual use of latex in a variety of finished products. Further and more complete details regarding such processes are contained in Dr. Royce J. Noble's book, "Latex in Industry," to be pub- issue of THE RUBBER AGE.—(EDITOR).**

WITHIN the past few years the rubber industry has begun to recognize the important place which latex is to hold in the future manufacturing of its products. Letting our imagination carry us back over the difficult path which the pioneers in rubber processing have blazed, we find that manufacturing progress has slowly but surely arrived at a distinct parting of the ways. Generally accepted methods are today being closely analyzed in the light of latex discoveries which conclusively show the possibilities of eliminating much manufacturing equipment.

Today the rubber industry is faced with the necessity of making decisions as to which of its products shall be revamped having in mind the use of latex instead of the familiar methods of gum compounding, milling, calendering of sheets, and molding or curing on forms. An interesting stage has been reached in the fabrication of rubber goods. It appears that carefully executed substitutions of latex for present materials will largely determine the industrial security of far sighted manufacturers.

For approximately one hundred years the mill room in its various progressive stages has been the backbone of practically every rubber manufacturing venture. It is traditional that smoked or acid coagulated sheets of gum must be broken down with heavy mills before calendering to gauge. Milled rubber stocks have also customarily been processed in heated metal molds under hydraulic pressure for forming and curing to exact reproductions.

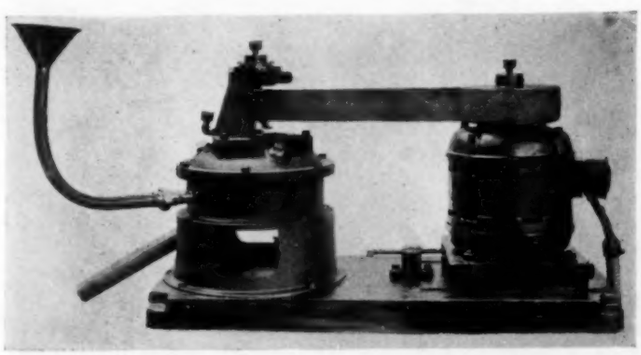


**FIGURE 1.—Premier Colloid Mills, such as the one illustrated here, are used in compounding latex for emulsifying and paste grinding.**

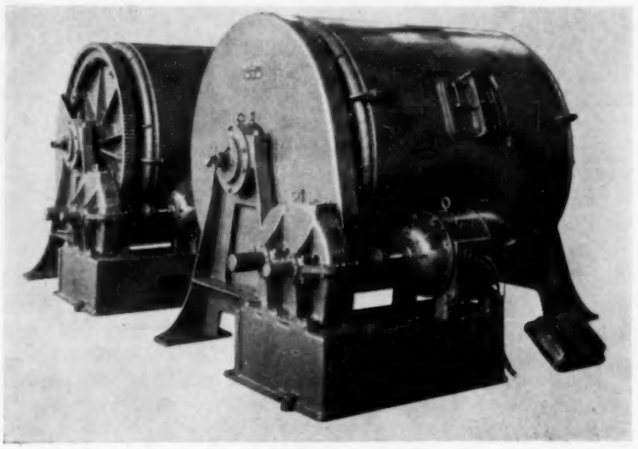


**FIGURE 2.—A ball mill, such as this Baker-Perkins model, may also be used in compounding latex for emulsifying and paste grinding.**

Latex demands little from present day mill room practice for its preparation. In general, the compounding of latex requires mixing vats or tubs for the liquid itself, colloid and ball mills (Figs. 1 and 2) for emulsifying and paste grinding, and suitable mechanical stirring means and strainers to combine the different mixtures.

Such a vast difference in old and new compounding rooms is striking. Heavy, noisy, and dust-covered equipment is virtually eliminated by the use of latex in place of compounding gum slabs. It has been found, however, that latex spatters too easily for factory cleanliness and that it dries in unsightly splash marks on everything within reach. The reclaiming of this air dried coaglum is a special problem in itself and will require much study from the by-product angle as the producer increases his tonnage of imported latex.

The various uses to which latex is applied affect the factory arrangement considerably. One can easily visualize a modern plant operating with centralized latex control and having stored in numerous vats the particular compounds needed for its products. If volume warrants and standardized compounds are possible, piping the latex is recommended over methods which involve toting and trucking even though large containers might be used.

Latex has been utilized in manufacturing by many methods. Among the most common are spreader coating, spraying under air pressure, churning and aerating the compound, dipping on forms, electrodeposition of rubber particles (see Fig. 3), and extrusion into coagulating baths. Any one of the above applications calls for manufacturing layouts which would be quite different from those in vogue when making use of rubber according to common practice.

When contemplating latex manufacture, there are many points to be considered in preparing plans for production

such as the convenient storage of raw material, means for replenishing used latex without halting production, mechanical devices for occasionally agitating the batches, temperature control and air conditioning for efficient water removal after treating the article, removal of the finished goods from their forms, etc.

There are many problems which crop up from time to time as one extends the latex to greater production and increases the volume of the mix. It appears that coloring and the introduction of the pigments needed will require patient research in compounding if dependable and accurate matching of latex to delicate fabric tints, such as one finds in clothing and sportswear, is to be obtained.

The storage of latex by the manufacturer is quite different from the warehousing of smoked sheets and their allied compounding chemicals. Latex is shipped in tank steamers and is transported inland in railroad tank cars. After reaching the factory siding it is generally pumped under relatively low air pressure from the cars into large reservoirs for storage. A latex handling plant presents a study in hydraulics which, although fairly simple at present due to the infancy of its industrial life, bids fair to become more complicated if the liquid is to be efficiently handled during the processing for its many new commercial applications. All latex piping should be of large size and turns should be avoided; the parts making up the system must frequently be removed to facilitate cleaning.

The matter of temperature control is also of considerable importance. When transporting or storing smoked sheets or pale crepe temperature has never been of much concern; latex, however, requires more supervision as it must be transported under extremely varied weather conditions. From the plantations it is shipped in many instances to climates which are subject, seasonably, to both extreme heat and sub-zero temperatures. Freezing of pipes and containers must be avoided; storage therefore, should be made inside the heated plant structure itself unless provisions for a reasonable temperature control of outside tanks can be provided for throughout the year.

While latex is in storage and before drawing for use it should be agitated, gently, at frequent intervals. After the addition of the compounding ingredients and while being held for consumption, the mixture is best preserved by keeping it from too much contact with the atmosphere in order to prevent surface skimming and premature coagulation as this results generally in an irreversible material. All storage tanks need cleaning at frequent intervals with steam or water and scrubbing with a wire brush helps in removing coagulated material.

The drying of latex treated articles before vulcanization would seem to be a very simple operation. Experience, however, has shown that the complete removal of water under constantly changing conditions of weather and other variables, is a link in the manufacturing chain which cannot be treated lightly. Fundamentally, all that is required is to dry the latex; actually, however, it must be done at a rate consistent with the results desired and at reasonable cost.

Most materials when wet, can be dried quickest if placed out of doors where the moisture-laden air in their immediate vicinity is moved away by air currents. The heat of the sun is also a big factor in fast drying. Commercial latex goods can not be dependent upon the whims of nature and so it is necessary to artificially aid the removal of the water content. Some of the more important factors governing the successful drying of latex before vulcanization are the following: humidity; removal of moisture laden air; time for drying; temperature and cooling.

The humidity of the drying chambers has considerable bearing on the speed with which latex-covered articles can be dried, and if dependable results are to be obtained, should be kept as constant as possible. Automatic control of this variable, although costly, is desirable in many instances.

Circulating means for removing the moist air from the immediate vicinity of the article to be dried is of much help in shortening the time required; too much air pressure should be avoided as it tends to thin out and flatten the skin of latex, leaving the gauge uneven and streaked.

The matter of temperature for the drying chambers is also a very important factor in water removal. If too high a temperature is used, particularly at the start of the drying operation, a prematurely dried surface skin will result and form an air tight seal. If this trapped moisture can not escape freely, as the drying continues, the previously dried film becomes ruptured and the appearance of the completed article is consequently marred by blisters and other blemishes during the cure. Uniformity of surface appearance is difficult to obtain unless care is taken to properly apply the correct amount of heat at the proper time during the dehydration process.

Cooling is another factor which must not be neglected when drying latex dipped goods in heaters. If the article has been subjected to considerable heat during drying, it should not be suddenly chilled, as surface contraction and other injuries occasionally result.

Latex is currently being used in the manufacture of so many different articles that only a few points of interest, common to some few commercial applications, can be touched upon. A very interesting field for manufacturing development, one which has already shown much promise, is the production of sponge rubber materials from latex froth. Rubber sponge as formerly produced was first run from mixing mills or extruders as a solid slab of plastic material to which had been previously added a suitable "blowing" agent. Molded and cured under pressure, the plastic mass became elastic and porous through the curing and gasification of its chemical components. It was then taken from the mold as rubber sponge. Often it was necessary to pass the sponge through pressure rolls, back and forth a number of times, in order to release the trapped gases from their rubber cells, thus giving increased and more uniform porosity to the voids.

FIGURE 3.—A group of industrial articles molded from latex by the anode process. Photo, American Anode, Inc.

The use of latex in making sponge materials presents quite a different picture. One successful method simply aerates the latex compound by churning and then cures it to desired shapes by pouring the froth into molds for

vulcanization in much the same manner as molten metals are cast.

Rubber upholstery for motor cars (Fig. 4) and furniture is one of the numerous fields opened by the exploitation of latex as sponge material due to the better quality, longer life, and all around improvement in physical characteristics which this new type of rubber cushioning appears to possess.

Among outstanding processes which have been in successful use for perhaps the longest time is that of tire cord immersion in a latex bath. The cord tire development, by replacing fabric tires, gave the public a much superior article and at a lower price. The latex bond which surrounds the cotton tire cords permits an assembly, side by side, of innumerable cotton strands into a solid, latex bonded sheet of material.

Much of the premature wear due to the frictional overlapping of the woven and coated fabric reinforcing has thus been eliminated. The latex cord principle will doubtless be applied to the construction of many new products and thus find broader use.

Rubber thread has been made for many years by machine cutting fine strands of rubber from a thin, rubber sleeve covering a revolving metal drum. Among the latex thread methods which have presented complicated manufacturing problems is the well known and commercially successful extrusion process. Latex is forced through a small orifice, after being carefully de-aerated to eliminate bubbles, into a coagulating bath which solidifies the rubber strand into an endless thread. The thread is then dried and cured by a more or less continuous process.

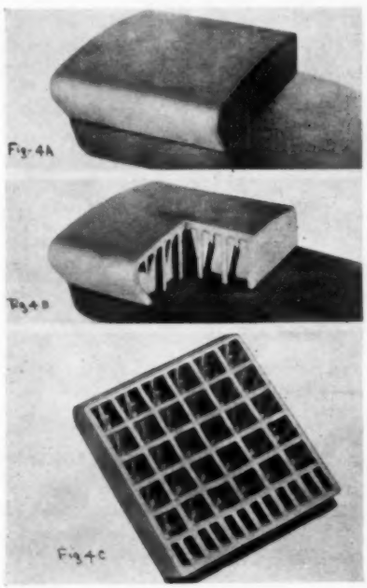



**FIGURE 4.—Three views of a Dunlopillo seat cushion adopted on 1935 Greyhound buses.**

The development of covering methods which permit fine, silken threads or other fibers to be spun at high speed about the coagulated and cured rubber filament, has opened a large market to this new material. Latex thread gives flexibility to size ranges, enabling a few sizes to cover most requirements. Garterless socks, flexible shoe lacings, gloves, corsets, surgical goods, and countless other things are already beckoning to the progressive buyer (see Fig. 5). The great variety of uses being exploited for latex thread will demand further manufacturing study by the producer in order that suitable performance can dependably be incorporated to meet exacting specifications.

**FIGURE 5.—Men's, women's and children's garments made with "Lastex" has resulted in a reduced number of required sizes.**

Latex can be purchased specifically prepared for a particular application and by so doing the uniformity of the batch and the difficulties of controlling its stability, color, and curing qualities, should be passed along as a definite responsibility to the dispenser.

The rubber manufacturer who adds latex to his list of raw materials must bear in mind that preservatives which give off irritating fumes should not be used excessively as labor efficiency would show a marked drop. Excessive damage to the product is certain to result if the workers are toiling under annoying conditions.

The question of which method is preferable, in producing latex goods is not an easy one to decide. On one hand we find electrodeposition for many products favored. Another group prefers spraying or immersion. It is largely a question of how easily the object lends itself to fluid application. Wire insulation, or cordage, for example, can obviously be latex treated by passing the braided filament or rope strands through a latex bath after which the water can easily be removed while the strands are being conveyed vertically and subjected to heat for drying.

An interesting field is opened for research by the possibility of using pre-vulcanized latex in the process. It has been known for some time that the individual particles of rubber found in latex may be vulcanized without solidifying the liquid mass. Pre-vulcanized methods offer some advantages over generally accepted procedures as vulcanization takes place before the article is formed; heat on a finished object which might be injurious to its component materials can thus be avoided. Only the latex itself needs factory space for curing so that valuable manufacturing area as well as considerable handling of goods can be saved which ordinarily would be required by the practice of final vulcanization of the entire article.

Drying of the pre-cured latex leaves vulcanized rubber which has practically the same characteristics or physical performance as heater-cured gum. Just how extensively this idea of using the pre-cured latex is to become a part of future production methods is impossible to say. Progress in chemical treatment and physical handling will undoubtedly give it a more prominent position in the field of latex applications.

# Korolac and Korogel

## Two New Goodrich Products, One a Solution, the Other the Jelly Form, of Koroseal, the Synthetic Rubber-like Material

CONTINUED experiments in the laboratories of the B. F. Goodrich Company have resulted in the recent introduction of two new products made from Koroseal, the synthetic rubber-like material, brought out early this year.* These products are Korolac and Korogel.

The first of these two products—Korolac—is a solution of Koroseal, and is recommended as a covering for plating racks, applied by the user, providing a translucent, corrosion-resisting, tough, inert coating with high dielectric resistance. Korolac is jelly-like at normal temperatures but becomes liquid when heated and in this state is ready for rack immersion. It cannot be used on plane surfaces because it does not adhere to other materials.

Korolac is not affected by chrome, nickel, cadmium, zinc, copper, brass, silver, or tin plating baths. In connection with these plating operations it withstands alkalis, sulfuric acid, nitric acid, hydrochloride acid, hydrofluoric acid, chromic acid, and water. The film formed is tough and elastic and requires severe physical abuse to be damaged. Broken film is easily repaired by re-dipping in the Korolac solution or by daubing the break with Korolac.

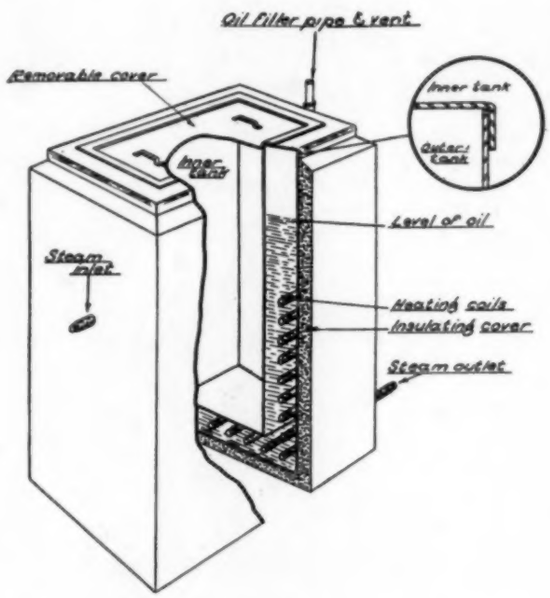
### Instructions on Applying Korolac

In applying Korolac, racks should be free from grease, dirt, salts, or loose metal. They should have no sharp edges or corners and all re-entrant angles should be filled. For the Korolac bath a vitreous, porcelain, or glass-lined vessel (similar in construction to the diagrammatic sketch illustrated herewith) is suitable. It should be equipped with a heating jacket. The oil used as the heat transfer medium is in turn heated with steam coils. A cover, coated like the heating vessel, is required to prevent loss of solvent while dipping is not actually being performed.

A temperature of 230° to 250° F. is generally required to bring Korolac into dipping condition. It must not be heated in contact with any metal since this results in a chemical change which makes it solidify so that it is unsuitable for further use. Dipping cold plating racks of any metal does not result in this change due to the fact that Korolac chills on the cold metal. It is recommended that plating racks be given four dips in Korolac which will result in a dry film thickness of .005 to .012 inches.

As the dipping tank empties the addition of more Korolac is the only attention required. When the addition of some solvent seems necessary, commercial thinners, such as alcohol, gasoline, or benzol, should not be used. A special thinner has been prepared by Goodrich for such cases. For the removal of a solvent contained in Korolac before racks are put in service it is recommended that the racks be dried in an air oven at 150° F., allowing about forty-five minutes between coats in the case where a large number of racks are to be coated. The racks should be allowed to dry for at least eight hours in the oven after the last dip before being placed in service.

* See the February, 1935, issue of THE RUBBER AGE.




**Goodrich recommends that users of Korolac make their own dipping tanks similar to the construction depicted here.**

The dipping room should be well ventilated in the same manner as when using a toxic and inflammable paint, since the vapors from the Korolac bath are somewhat of this order. If convenient the dipping and drying should be done under hoods. The fumes or vapors are non-corrosive and therefore special corrosion-resisting alloys are not necessary for the ventilating system.

### Characteristics of Korogel Forms

Several forms of Korogel, the other new Koroseal product, each of a specific compound, have also been introduced by Goodrich. Korogel is the jelly form of Koroseal. It is primarily a material for making flexible molds used in casting plaster of Paris, Keene's cement, Portland cement, Hydrocal, or other types of synthetic stone. It replaces glue-gelatin normally used for this purpose and is said to have superior properties.

Korogel can be re-melted and used over again in the same manner as glue-gelatin. Korogel molds will not dry out and are not affected by atmospheric temperatures. They reproduce fine details. Although Korogel replaces glue-gelatin the procedure in handling it is somewhat different from that followed in handling glue.

Koroseal, and its products, are said to be superior to rubber for the manufacture of a number of products other than those described, and to possess even greater flexing strength than rubber.

# Petroleum Solvents and Naphthas

## A discussion of the Properties and Characteristics of Petroleum Solvents and Naphthas Together with Their Uses

**By E. M. Toby, Jr.**

Manager, Naphtha Division, American Mineral Spirits Co.

PETROLEUM solvents and naphthas are widely used for many different purposes in the different branches of the rubber industry, but of the many raw materials used in this great industry, it is doubted if any are less understood. The development of the petroleum naphtha and solvent industry has kept pace with the rubber industry, but so gradual has been its advance, and probably so insignificant to the rubber industry, that the majority of manufacturers probably still regard it as being in its swaddling clothes. It is possible that for this reason many have not taken advantage of some of the more recent advances made in this field.

Even as late as five to ten years ago the possibilities of securing a passable naphtha or solvent were poor—and there were no possibilities of obtaining a naphtha especially designed to suit individual manufacturing requirements. In those days naphthas were "nuisance" products, hated by refinery superintendents and a bother to the sales organization. Specifications were very general, and the consumer was forced to take the available naphthas whether he liked them or not—in fact he had little or no voice in the matter. Materials in those days often did not meet the then existing general specifications and there was no hope of consistent shipments, even from the same supplier.

Today the story is totally different. The once indifferent refiners are now devoting whole refineries, or separate units of larger refineries, to the manufacture of naphthas or solvents. Naphthas and solvents can be made to the most exacting individual specifications, suiting each specific need as required. Shipments today from the same refinery can check past shipments, in all specifications, with an almost unbelievable consistency. The "take it or leave it" attitude has disappeared, the consumer must be pleased and the majority of the suppliers have so equipped their sales force that they are equipped to interpret the consumers' needs and to supply them with materials to suit their most exacting specifications.

### Differences in Crude Oils

To know definitely just what is meant when we speak of petroleum naphthas and solvents, let us briefly review the chemistry of petroleum (crude oil) and the manufacture of naphthas and solvents therefrom.

The term naphtha is often wrongfully used, the generally accepted definition of a naphtha being,—any closely fractionated cut of petroleum having an end point of below 510° F. Naphthas are distilled from crude oil, by conventional distillation methods, into different boiling fractions as desired, and chemically treated to varying degrees of purity, the method and degree of treatment being determined by the ultimate use in view for the naphtha.

No two crude oils are alike, each crude oil being principally a mixture of hydrocarbons of different boiling points. One crude oil will differ from another in the nature of these hydrocarbons and the relative percentages of these hydrocarbons present. The different chemical compositions of these hydrocarbons will result in wide physical differences between the crude oils and all products derived therefrom. Crude oils are classified in geographical terms as crude oils from one field vary greatly from crude oils from far removed fields.

### Hydrocarbons Found in Petroleum

The principal hydrocarbons found in petroleum are the Paraffins ($C_nH_{2n-2}$), the Olefins ($C_nH_{2n}$), Naphthenes or cycloparaffins ($C_nN_{2n}$) and Aromatics ($C_nH_{2n-6}$). Less common constituents of petroleum are the Diolefins ($C_nH_{2n-2}$), Olefineacetylenes ($C_nH_{2n-4}$), Olefine Terpenes ($C_nH_{2n-4}$), Diacetylenes ($C_nH_{2n-6}$) and Triolefines ($C_nH_{2n-6}$). The light fractions of most crude oils are paraffinic in character, Pennsylvania crudes being possibly the most paraffinic of all crude oils.

After the different fractions are removed from crude oil, the bottoms of this process are subjected to cracking (effect of high heat and pressures) which increases the olefine content of the naphtha. It is for this reason that cracked naphthas are very unsuitable as the olefins impart an obnoxious odor to the solvents and make them color unstable and cause the precipitation of a shellac-like gum.

Petroleum rubber solvents boil in the range of from 90° F. to 400° F., the following hydrocarbons falling in this range, and being the principal constituents of these rubber solvents:

| | | |
|---|---|---|
| Normal Pentane | Iso Heptane | Normal Octane |
| Amylene | Heptylene | Cyclo octane |
| Tertiary Hexane | Normal Heptane | Normal nonane |
| Di-isopropyl | Di-isolutyl | Nonylene |
| Iso Hexane | Iso-octane | Decaylene |
| Normal Hexane | Cycloheptane | Normal decane |
| Cycle Hexane | Acetylene | Undecane |

Some of these fractions are fractionated to almost constant boiling hydrocarbons and their use is now increasing for special purposes in the rubber industry. Once the desired fraction is distilled, it must be chemically treated to insure the removal, or transformation, of any components that might harmfully affect materials with which the finished solvent might come in contact.

The principal reagent for the treatment of naphthas is sulfuric acid, with consequent neutralization with caustic soda or soda ash. A quantity of from 1 to 5 pounds per barrel is used for treatment, 93 to 98% acid being used for

this treating, and occasional fuming acid with as much as 20% added $SO_3$ being used. Sulfuric acid will remove all nitrogen compounds from the oil, weak acid being sufficient for this.

Principal of the compounds to be removed or converted are the sulfur compounds. Some sulfur compounds present in naphtha, in addition to elementary sulfur, are —mercaptans, hydrogen sulphide, alkyl sulfate, sulfuric acids, alkyl sulfides, carbon disulfide, sulfoxides, sulphenes and thiophenes. Sulfuric acids of various concentration have ability to react with aromatics and olefins and they may be removed accordingly.

### Objectionable Sulfur Compounds

The mercaptans or thio alcohols are the most objectionable of all sulfur compounds present in naphtha. They are primarily responsible for the familiar "onion smell" present in some naphthas, which therefore may be considered as poorly treated or untreated naphthas, as the removal or conversion of the mercaptans is not an impossible problem. The removal of these mercaptans or their conversion to alkyl sulfides is known as "sweetening" and some of the more widely used sweetening processes are as follows:

Sodium Plumbite (Doctor treatment)
Lead Sulfide
Sodium Hypochlorite
Calcium Hypochlorite
Chlorine

The reduction of total sulfur is also a necessity, some of the methods used for reduction follow:

Sulfuric Acid.
Aluminum Chloride.
Activated Aluminum.
Metallic Zinc.
Mercuric Salts.
Metallic Mercury.
Metallic Sodium.

The presence of sulfur, or sulfur compounds in naphtha is very disturbing, and great care should be taken in the treatment of naphthas for sulfur removal, or for the conversion into harmless sulfur compounds.

Modern refineries generally use the following control tests on naphthas:—Gravity, Distillation, Drying time, Neutrality of Residue, Odor and Color of Residue, Flash Point, Doctor Test, Corrosion, Color, Percentage of sulfur, Vapor Pressure, Presence of Undissolved Water, Viscosity, Odor, Greasy Residue, Kauri Butanol Solvency, Linseed Oil Reduction Ratio, Nitrocellulose Tolerance, Aniline Point, Dimethyl sulfate number, etc.

To the rubber technician, the following of these tests are most important:

In processing when a rapid drying solvent is employed, and when grease free drying is important, the Greasy Residue test shows the presence of any slow drying tail fractions that fail to evaporate with the more volatile front portions of the solvent. It is possible that such fractions might be present in such a negligible amount that they would not show up in the distillation curve, and yet might cause trouble in use.

The distillation test is carried out by A.S.T.M. procedure but unless correctly interpreted is often a false index as to the actual drying properties of a naphtha. The whole distillation curve should be taken into consideration, not only the initial boiling point and the dry or end point as is often done. The distillation curve of a naphtha is hard to interpret in terms of plant performance as it reports the distillation of the naphtha under arbitrarily set conditions.

The drying time is of the utmost importance and this test is sadly in need of standardization. We employ the AMSCO Evaporometer, which gives trustworthy relative results, when comparing solvents. Chart No. 1 shows the more common rubber solvents compared to Butyl Acetate which is employed as a standard. When discussing the evaporation of a petroleum product, it must be remembered that we are not dealing with a constant boiling compound but with a series of such compounds. Therefore the *complete* evaporation curve should be studied, not just the total evaporation time. The average boiling point of a naphtha, as determined from its distillation curve, is a reliable index as to the relative drying properties of a naphtha, when comparing it with other naphthas. Chart No. 1 shows the evaporation curves of some of the more common rubber solvents, both petroleum and coal tar.

The odor is of great importance to manufacturers and is closely related to the doctor test, and the percentage of sulfur present. The doctor test is a qualitative test to show the presence of mercaptans and parallels the doctor (sodium plumbite) method of treatment employed in the refinery. The presence of any mercaptans impart a very characteristic, and very foul, odor to the naphtha. The presence of other sulfur compounds also injure the odor of the naphtha and their presence is detected by the total sulfur content of the naphtha.

Those manufacturers working with the more volatile solvents are beginning to realize the importance of vapor pressure tests. In the future we will see this test gradually replacing the initial boiling point specifications, as maximum vapor pressure specifications would naturally limit the initial boiling point.

### Solvency Tests on Naphthas

The solvency tests on naphthas are proving more and more of interest to petroleum technicians interested in products for the rubber industry. Of all of the tests used, it is probable that the aniline point is the most convenient test and the most significant. The lower the aniline point, the better the cutting power of the naphtha. The chemical composition of naphthas, as indicated by these solvency tests, is being recognized more and more.

In the past, the physical properties of petroleum solvents have been taken fully into consideration but too little attention has been paid to their chemical composition and its relationship to the ultimate use of the naphthas.

Naphthas are generally specified by distillation range but this is fast being supplanted by drying time specifications. Once a user settles upon what drying fraction he wants, then the other specifications must be set forth, some of which are limited by the drying time specification itself, whereas others are independent of this particular property.

In this day and age, generally all naphthas furnished by reputable concerns are free from water, are doctor sweet and pass A.S.T.M. and full distillation corrosion tests.

The specific gravity, of course, varies with the distillation range and it is also a function of a chemical composition of the naphtha. Paraffine hydrocarbons have a very low ratio of specific gravity to distillation range. Naph-

thenes have a higher ratio of specific gravity and aromatic hydrocarbons have a very high ratio of specific gravity to distillation range. This difference is very marked and is reflected in the A.P.I. gravity, which is a function of the specific gravity. An extreme example would be in the case of benzol substitutes, which have a distillation range of approximately 140° to 220° F. Such a material made from a Mid-Continent crude, which is paraffenic in character, would have an A.P.I. gravity of about 70/71 (.7022—.6988) whereas the same product specially prepared from a high solvency crude would have an A.P.I. gravity of 66.0° or a specific gravity of .7165.

In addition to naphthas from crude oil, some light fractions are refined from casinghead gasoline, which is derived from the wet natural gasoline originating from the wells. This material is also known as "natural" gasoline.

Butane, boiling at 14° F.
Pentane, boiling at 96° F. (Actually 82° to 100° F.) are taken from natural gasoline but have no application in rubber.

Normal hexane (140°-156° F.),
Normal heptane (194°-212° F.)
Mixed heptane (117°-239° F.),
Mixed Octanes (212°-284° F.)

are also derived from natural gasoline and may be applied where fast drying, closely fractionated naphtha without greasy residues are necessary.

The petroleum ethers (86°-140° F. and 104°-167° F.) are also fast drying naphthas, but with wider ranges, which may be used when speedy drying is necessary.

### The "Regular Run" of Naphthas

We will now discuss the more regular run of naphthas that are better known to the trade. The necessity of replacing Benzol was soon noted by the manufacturers of petroleum solvents. Two general types of solvents are now popular, the most popular being "Rubber Solvent" boiling in the range of 100/300. This is the cheapest of petroleum Benzol replacements and today some grades have as close a boiling range as 110/270. A closer fractionated, faster drying replacement is the more costly special fractions having ranges at 140/200 and 140/220. This closer fraction eliminates the possibility of a rubber cement skinning, resulting in the entrapment of portions of the naphtha that cannot work to the surface. This will result in bubbles, pinholing, soft spots, faulty adhesion, etc. While eliminating these faults, the low end point will eliminate tacky drying. A very fast drying rubber solvent has a range of 100° to 210° F.

The 140/220 fraction is also excellent as a curing solvent, some suggested formulas being

50% Carbon Bisulfide
50% Curing Solvent
1% Sulfuryl Chloride
—OR—
50% Carbon Tetrachloride
50% Curing Solvent
1% Sulfuryl Chloride

Following these Benzol replacements in drying time come the Toluol replacements, having as a rule distillation ranges of 175/225° F., or on newer specifications, 205/265° F. This fraction is used principally in the manufacture of lacquers but has some applications in rubber cement where a solvent having a slower drying time than Benzol is necessary.

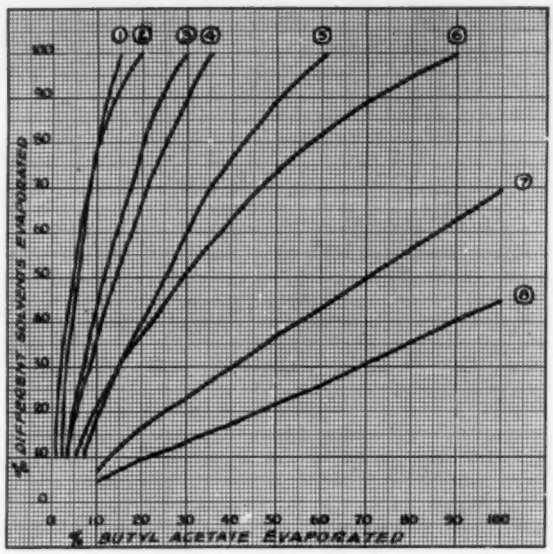



CHART I.

Key: (1) Benzol Replacement; (2) Regular Rubber Solvent; (3) Benzol; (4) Toluol Replacement; (5) Toluol; (6) Close Cut Dipping Solvent; (7) Xylol; (8) High Flash Rubber Solvent.

We now come to dipping cement naphthas and here we find a very wide divergence in specifications. These materials are also known as V.M.&P. (Varnishmakers and Painters) Naphtha and some of the older standard specifications are 180-360, 200-340, 190-325, 200-300.

The more modern specifications on material of this type call for specifications of 230/300. The high initial eliminates undue volatility, with losses in dipping vats, gives slower set up on the molds and gives good flowing qualities to the cement. The low end point retains the fast end drying qualities of the naphtha.

Very few naphthas with ranges above these heretofore discussed are of major interest to the rubber industry but I will review the more standard specifications briefly.

More slower drying than the dipping solvents are the Xylol replacements boiling in general between 280/360° F. These naphthas have a Tag closed cup flash of over 80° F. and do not need the red label in interstate commerce. These naphthas have a drying time intermediate between V.M.&P. Naphthas and mineral spirits.

Next in drying order are the mineral spirits which are in general those naphthas having a Tag closed cup flash of over 100° F. The most general specification is 300/410° F. but there are some faster drying fractions with the same flash point but distilling between 310-350° F. Slower drying mineral spirits are available with ranges of 300/425, 325/410, and 360/410. The latter two materials have flash points of 115° and 140° F. respectively.

Still slower drying naphthas are available having distillations of 360/460° F. and 360/480° F. These materials have a flash point of over 140° F. and are used in special instances in the place of kerosene, where the greasy tails of kerosene would prove harmful.

Of the naphthas of different chemical composition, that is those made in an unconventional manner, we may list the following:

Hydrogenated Naphthas
Edelanu Process Naphthas
Special Naphthenic Base Naphthas

Hydrogenated Naphthas are in reality naphthas produced from oil that have been very severely cracked in the vapor

phase, and to which hydrogen has been added in the presence of a catalyst.

Edelanu naphthas are naphthas extracted from high naphthenic and aromatic base oils by liquid sulfur dioxide at low temperatures. The sulfur dioxide exerts preferential solubility for these products.

These two types of naphthas are but little different in properties for most industries and for our purpose we will take an Edelanu Naphtha as an example of the two. The special naphthenic base naphthas come but from one isolated and unexplained crude oil field and are especially processed to increase their naphthenic and aromatic content.

### Problem of Proper Specifications

Of the many uses for petroleum solvents, there exists in the dipped rubber goods industry probably more diversity of opinion as to proper specifications than in any other. Many reasons contribute to these differences in opinion.

While many of the difficulties encountered in the dipping room might correctly be traced to the use of naphtha of improper specifications, there also are many other causes for poor results. Among these may be listed:

1.—Over-milling or under-milling of rubber.
2.—Poor atmospheric conditions in the room.
3.—Insufficient or poor screening of windows, doors, etc., allowing the entrance of bugs, mosquitoes, etc.
4.—Carelessness on the part of dippers, allowing forms to bump in handling.
5.—Too much or not enough time in dipping.
6.—Too much or not enough time between dips.
7.—Vibration of cement tanks.
8.—Irregular control of temperature.
9.—Not allowing enough time for tanks to settle.

Granting that drying time of the cement on the forms is extremely sensitive to atmospheric conditions and changes thereof (and this is quite generally conceded), it is obvious why so many differences in opinion exist as to the right boiling range of the naphtha to be used. Each plant owner believes his problem to be entirely different from that of his neighbor, and it is further obvious that he is more or less correct.

As a result we see in use today in these plants naphthas ranging in initial boiling point from 180° F. to 240° F. and in A.S.T.M. end point from 290° F. to 380° F.

For the modern dipped goods plant, maintaining a room temperature of about 100° F., the naphtha producing best results in making household and physician's gloves as well as toy balloons, has been found to carry an initial boiling point of about 215 F.° and A.S.T.M. end point of about 315° F. For heavy electrician's gloves, the initial boiling point should be about the same but the end point about 340° F. Some manufacturers go as high as 360° F.

There are those in the industry who believe a summer and a winter specification should be used. If room temperature is properly controlled it is obvious that two specifications are unnecessary. In fact, it is natural to assume far better results would be obtained by the use of only one specification, since the dipper would soon become proficient in timing all phases of the dipping operation. In other words, the more uniform the cement vehicle from month to month, the better will be the results obtained. However, the manufacturer of dipped rubber goods who is not fortunate enough to own a modern plant may find it advisable to use a naphtha in the summer months carrying an end point of from 20° to 40° higher than the naphtha he uses during the winter months.

The average manufacturer of dipped rubber goods is not inclined to investigate the claims made by a refiner for an improved naphtha. Down through the years, he has become accustomed to seconds and rejects running from 5% to as high as 25%. He considers this loss normal and thus is created the *laissez faire* attitude. It is inconvenient for him to make a plant test of a new naphtha, and he goes along taking unnecessary losses from month to month.

An exception to this general attitude is recalled in the case of a large manufacturer of household and physician's gloves in Ohio. For years he had been using a naphtha with a boiling range of 225°/360°. A technician called many times at this plant before arranging for practical plant tests of a naphtha having a boiling range of 215°/315°. Temperature control in this plant was excellent, but still the manufacturer had continued to use the same naphtha specifications which had been in use many years. As a result of experimenting with this new specification, having a boiling range of 100° as compared with the old of 135°, and an end point 45° lower, they have since adopted the new specification. Only a few weeks ago, the plant superintendent and chemist made the statement that seconds and rejects had been materially reduced in addition to speeding up the drying time.

All crude oil contains at least a slight percentage of sulfur. In working with pigments, to avoid color streaks, the cement making naphtha should be perfectly free of this trouble maker. The refiner interested in supplying the dipped goods industry with the best available product will take unusual precautions to eliminate every trace of this source of trouble. The employment at the refinery of the proper method of treatment will not only accomplish this desired result, but will also result in the production of naphthas quite free from objectionable odors which might be carried into the finished article.

### Importance of Ventilation Systems

Probably the most important factor is the ventilation system. The more up-to-date plants have adequate air intakes, humidifiers, heating coils, dehumidifiers, distributing systems and exhaust vents, and all must be in perfect working order to produce the best results. In one plant, for instance, it was found that a good bit of trouble was due to naphtha blisters and that they were obtaining their intake air from a basement room which was not open to the outside. This, in effect, created a vacuum in the dipping room and the lower barometric pressure caused vaporization of the light ends in the naphtha.

Some of the manufacturers indulge in the practice of buying naphthas with too low an initial boiling point, and after mixing allow the cement to age or settle for about one week. This process permits the escape of most light ends and as you will readily observe is somewhat wasteful, but there is a general feeling that aging is beneficial for practically all of the cements.

Some of the manufacturers filter their cements before aging. This is usually accomplished simply by passing the cement through a 60 to 100 mesh screen and this removes dirt, wood particles, lumps, etc., which occur in

*(Continued on page 90)*

# Conveying Dunlopillo Molds

## System of Belt and Pallet Conveyors, Connected by Roller Curve, Used to Carry Molds to Hot Water Tank

By C. S. McChesney[1] and H. E. Elden[2]

*In Cooperation with*

M. J. Anderson[3]

TO overcome the peculiar problems met in the manufacture of Dunlopillo cellular rubber cushions at the Dunlop factory in Buffalo, New York, a special system of conveying equipment was designed. Not only do the molds in which the rubber froth is poured have to move forward to the hot water tank at a certain set speed, but they also must move with as little vibration as possible in order not to disturb the gelling of the froth.

The manufacturing of Dunlopillo cushions, as is well known in the rubber industry, is briefly as follows: Vulcanizing agents and compounding materials are added to 60 per cent latex to which ammonia has previously been added as a preservative. This mixture is continuously agitated until thoroughly mixed in 2,000 gal. mixes. A given quantity of this mixture is weighed, and to it is added a small amount of a froth producing agent. This mixture is beaten into a froth by means of a double mixer equipped with a special whip. The ratio of the volume of air to latex compound is controlled by the time of frothing, and is varied according to the density required in the final product. At the end of the frothing time, a small quantity of a gelling agent is added, which, after a time interval of 10 minutes, will cause the froth to set to a gel-like formation consisting of countless interconnected air cells which provide complete porosity.

This froth is poured into the molds directly after the frothing operation so that a gellation of the froth will occur in the molds, thereby forming the final shape of the product with the vertical cavities. As the froth is fluid when poured, complicated and deep molds of any structure or design may be easily filled. The molds which have been placed on a belt conveyor prior to the pouring operation travel a distance of 97 feet in 26 minutes to a roller chain, steel pallet conveyor which runs through a tank of hot water.

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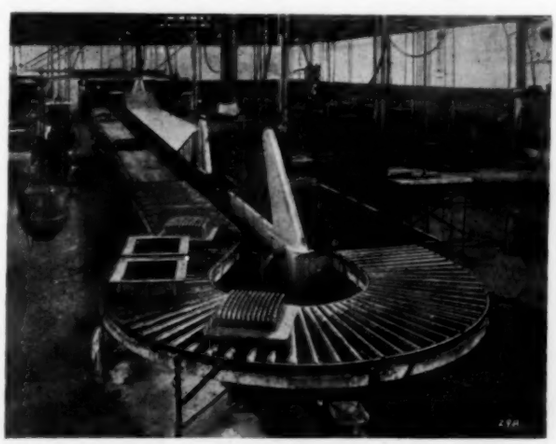


**FIGURE 1.—This view shows the roller curve connecting the discharge end of the cold water tank with the belt conveyor.**

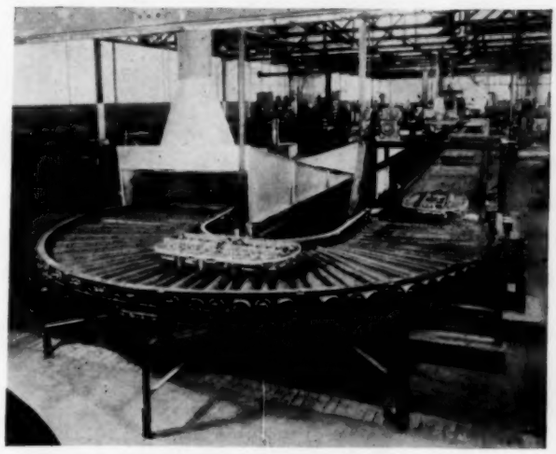


**FIGURE 2.—A 180° chain driven live roller curve is used to connect the hot water tank and belt conveyor.**

During this handling of the molds it is necessary that vibrations be kept to a minimum, in order to prevent a breakdown of the froth during the gellation. Both the belt and pallet (tank) conveyors are fitted with variable speed drive transmissions. The belt conveyor has an approximate speed of 1.2 to 6 feet per minute. The pallet conveyor used for conveying molds through the hot water tank for the purpose of setting the mold runs at an approximate variable speed of .5 to 2.5 feet per minute. Molds on this conveyor pass through hot water maintained at a temperature of 205° F. Total immersion is 60 minutes, during which time the product is vulcanized.

The system of conveyors used is arranged in the form of a loop (Fig. 1). The connection between the belt conveyer and the tank conveyor is made by a Mathews 180 degree chain-driven live roller curve, which makes use of tapered steel rollers. These convey the molds radially during their travel from the belt to entrance of hot water tank (Fig. 2).

As the molds emerge from the discharge end of the tank they are conveyed onto a 33-inch table of roller conveyor where the lids of molds are opened and the product removed, the empty molds continuing on conveyors to a tank of cold water. As the molds come from the tank of cold water, they are air dried, lubricated, and again started on the cycle of manufacturing process.

The connecting link between the discharge end of the cold water tank and the belt conveyor mentioned above consists of a 180° roller conveyor curve (Fig. 1) set at a grade so as to convey empty molds by gravity. The molds conveyed range in size from 12″ x 12″ to 60″ x 36″ x 12″ high and weigh up to 500 lbs. each.

## Petroleum Solvents and Naphthas

*(Continued from page 88)*

crude and milled rubber. Such processing usually requires about 15 minutes for about 300 gallons of cement.

The more advanced manufacturers, of course, use mechanical dipping apparatus and for this reason obtain much better results than the older hand-dipped articles. This factor is tied up somewhat with the design of the form and the principal difficulty encountered is the formation of air blisters which occur through the occlusion of a tiny particle of air on the first section of the form as it penetrates the cement. This never occurs on the first dip where the raw form encounters the cement but does not occur frequently on succeeding dips. These air blisters are also caused by cement strings snapping back to the form as it is withdrawn from the tank and they are also formed if sufficient time is not allowed between dips, because when the cement drips from the wet form it usually causes air bubbles in the cement tank and these take quite some time to break.

In general, defections due to blisters run about 15% of the forms processed and it has been estimated roughly that 85% of them are air blisters and the rest naphtha blisters. Naphtha blisters, of course, are caused by skin drying of the cement. The rate of dipping must also be uniform and after the forms have been dipped the racks are turned upside down at regular intervals to permit the cement to flow out on the forms uniformly.

It is the obligation of the refiner to the manufacturer that he supply a naphtha uniform in all particulars month in and month out. Initial and end points should not vary more than four or five degrees. Good solvent power should be uniform which will result in constant viscosity of the cement. Periodic plant observations should be made jointly by the dipped goods manufacturer and the refinery representative. By studying conditions found in each individual plant, and by the close cooperation of the dipped goods manufacturer with the naphtha refiner, it not only is possible but entirely probable that ways and means will be found to eliminate or greatly reduce the expensive heat blisters, tank blisters, streaking, and other costly contributing factors.

[The writer thanks Mr. M. A. Williams and Mr. R. Weppner for their assistance in preparing this article.]

## Rubber Manufacturing in India

RUBBER manufacturing activities in India have been increasing at a rapid rate in the past few years, according to American Trade Commissioner George C. Howard, at Calcutta. Bata is producing about 20,000 pairs of rubber footwear daily in its Indian factory, while numerous small Indian enterprises are collectively producing approximately 30,000 additional pairs daily. One of these concerns is the Supreme Rubber Company, of Bombay, with a capacity of 1,500 pairs daily.

A bicycle and carriage tire factory at Karachi, known as the Lakshmi Rubber Works, has a capacity of 1,000 tires daily, while three small units in Rangoon are making rubber goods for use in rice mills and are said to be using about 1,000 pounds of rubber per month. The recently-opened Travancore State Rubber Factory, at Travandrum, is manufacturing tires, hose, waterproof clothing and toys. Two tire retreading plants are also in operation, one in Calcutta, the other at Bombay.

## Schrader Tire Inflation System

A SYSTEM providing a means whereby the pneumatic tire pressures of any vehicle may be gauged or controlled from the body of the vehicle has been developed by the A. Schrader's Son Division of the Scovill Manufacturing Company, Brooklyn, N. Y. The system hinges on a rotating pressure joint attached or built into the wheel hub of the vehicle permitting tubular leads to interconnect the valve mouth of the tire's inner tubes with tanks, gauges, pumps, regulators or alarms carried in the vehicle body. The operator knows the tire pressure at all times and may increase or decrease it at will, either manually or mechanically depending on the control system installed.

Schrader rotating joint connected to rear wheels.

The rotating joint which forms the major unit of the Schrader running or continuous inflation system consists of an impervious flexible diaphragm of self-lubricating material held tightly against a lapped steel insert seat and the air pressure tends to hold it more securely against possible leakage. The entire unit replaces the present hub caps, or may be more intimately built with the hub construction.

In making a connection from the rear wheels of a car to the body it is necessary only to provide a flexible hose or tubing between the joint and a fixed point on the car structure, providing adequate slack for all motion. Two methods have been found satisfactory by Schrader for making connections to front wheels, one being an internal method whereby the air is piped through a drilled hole in the axle forging to a connection on the inner part of the forging, the other bridges around the wheel with a strong metal tube secured to the spindle. Flexible hose is used in both methods for terminal connections. Many methods of handling tire pressure may be installed once the connection between the rotating wheel and car body has been successfully accomplished.

## Metolglaz Dipping Forms

TO meet a growing demand for balloon dipping forms in novel and intricate shapes, Process Molds, Inc., of Fort Wayne, Indiana, have developed a new type of dipping form known as Metolglaz. These forms are based on a new alloy of featherweight, and are said by the manufacturer to be economically produced in intricate shapes. When extremely hard service is encountered Metolglaz forms are given a treatment which gives them a glass hard surface.

## Ovac—A New Accelerator

SPECIFICALLY developed for tire treads to meet severe service conditions, a new accelerator, named Ovac, has been introduced by the Naugatuck Chemical Division of the United States Rubber Products, Inc., New York City. It is a blend of the thiazole derivatives of two specially selected aldehyde-amines, and is recommended for use in connection with a small proportion of T-J-B, an anti-scorch and anti-oxidant, which reduces persistence and overcuring. A combination of 0.875 part of Ovac and 0.125 of T-J-B is recommended.

It is not necessary, according to Naugatuck Chemical, to change other parts of the tire in order to use an Ovac tread. It is said to have accelerating strength comparable to that of the accelerators at present in general use; to be compatible with thiazole, aldehyde-amine and other accelerators when present in adjacent stocks; and to cause less stiffening after the regular cure. It is a light yellow powder, with a specific gravity of 1.40 and a softening range of 90° to 95° C. T-J-B is a brown powder.

While Ovac is especially designed for a tread accelerator it is said to give good results in all types of vulcanization—mold, air or steam cures. It may be used with and without T-J-B.

## "RPA No. 1"

A METHOD of producing rubber of any desired plasticity without the use of softeners, which swell the rubber and detract from its quality, has been made possible by the introduction of a rubber peptizing agent, briefly known as "RPA No. 1," by the Rubber Chemicals Division of E. I. du Pont de Nemours & Company, Wilmington, Delaware. The new product, discovered by Messrs. Williams and Smith of the DuPont research staff, is the zinc chloride double salt of phenyl hydrazine, a finely divided solid. It has a specific gravity of 1.095. According to DuPont it is equal to phenyl hydrazine when used on a molecular basis. It is a non-volatile solid overcoming the objectionable toxicity and volatility of straight phenyl hydrazine, and is safe to handle.

Laboratory tests conducted with No. 1 ribbed smoked sheets, in which the "RPA No. 1" was added to 1500 grams of rubber on an 8 x 18" mill with rolls maintained at 70° C. in accordance with the following milling specification

0 min.—Add rubber
6 min.—Add "RPA No. 1"
8 min.—Start cutting
12 min.—Off

resulted in the conclusions that the increase in softness is proportional to the amount of "RPA No. 1" used and that the amount of heat treatment after milling which is required to develop the full plasticizing effect of "RPA No. 1" is proportional to the amount used.

In factory practice, DuPont suggests that "RPA No. 1" be mixed with the rubber preferably in the absence of other compounding ingredients, since sulfur, carbon black and clay have been found to interfere with its peptizing action and should not be added until after the "RPA No. 1" has had an opportunity to exert its full effect. It may be incorporated with the rubber on an open mill, in a Banbury or other internal mixer, or in a Gordon Plasticator, the objective being to incorporate it uniformly with the least possible mechanical working. After mixing, the rubber should be stored in a warm room or protected so as to cool slowly.

In order to produce treads that will tube fast, calender smoothly, and hold their gauge, weight, width and length within close limits, it may be desirable to treat rubber for tire tread compounds with as much as 0.5% of "RPA No. 1." Treatment with rubber with more than this amount may be desirable for friction stocks, especially high-grade frictions that are run on light-weight or tightly-woven fabrics where impregnation is difficult. For products that call for a thoroughly masticated rubber, treatment with 1% is suggested.

The plasticity of rubber through the use of "RPA No. 1," according to DuPont, may be controlled to degrees of softness which range from normal plasticated rubber to rubber that will flow at room temperatures, without prolonged milling and without adding softeners or diluents. Rubber softened with this peptizing agent is said to appear to be superior to ordinary masticated rubber in aging, abrasion resistance, and flexing resistance. It is also recommended to reduce the viscosity of rubber cements.

## Rubber in the Gas Industry

RUBBER is being used to an increasing extent in the three prime divisions of the gas industry—manufacture, distribution and utilization—said Mr. C. R. Austen, of the Gas Light & Coal Company, London, before members of the London (England) Section of the Institution of the Rubber Industry, recently, in an address indicating the quality of rubber required for those three branches. His talk was concentrated on principle uses of rubber only.

For the handling of coal, coke and clinker, during the manufacturing processes, the industry leans heavily on rubber and canvas conveyor belts. Some belts as wide as 54 inches are in use, carrying 2,000 tons of coal per hour, one in particular having carried 11 million tons without showing any appreciable sign of wear. Coke, because of its abrasive properties, imposes a greater degree of wear, but a good conveyor belt should carry over 300,000 tons before requiring repair or replacement, according to Mr. Austen. Where the temperature of coke exceeds 250°F. an asbestos lining is generally used beneath the top layer of rubber.

Other uses for rubber during the manufacturing of gas is in liners for saturators in ammonium sulphate plants; hosepipes for stem, air and water; liners for shoots in coke plants; covering of the wires of coke screens by anodic deposition; and in hydraulic valves, diaphragms, joints, etc.

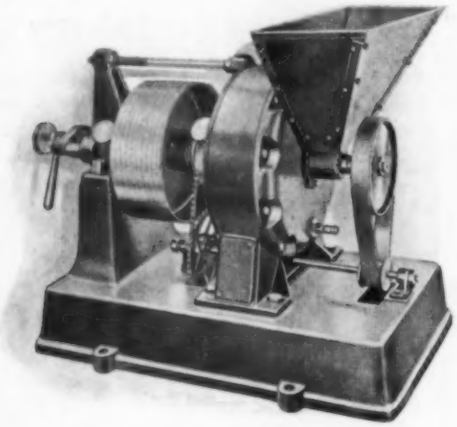
Rubber joints are finding increasing favor in the distribution of gas, their advantages overshadowing their disadvantages. Among the advantages the speaker listed the following: quick assembly by unskilled labor, their assembly frequently made outside the trench before laying; they withstand the effects of traffic vibration, soil subsidence and longitudinal movements due to pipe expansion; small leaks occasionally seal themselves by expansion of the rubber, due to the swelling action of the escaping gas; and changes in the direction of a pipe can sometimes be made without the use of specially shaped bends. The principal disadvantage of rubber joints lies in the wide dissimilarity of the shape and composition of those used for gas joints.

In the utilization of gas Mr. Austen deplored the fact that the flexible metallic tubing used for connecting gas appliances to the supply has not been found to stand up as well as it might. The tubing is subjected to rough usage, and is known to shrink after prolonged use. It also softens at high temperature, and readily absorbs the hydrocarbon constituents of coal gas which adversely affects its age-resisting properties. The speaker stated, however, that several interested parties are now conducting comprehensive tests to produce a rubber that would overcome these objections.

# New Equipment

## Roca-Guix Grinding Mill

A GRINDING mill which operates on a new principle of grinding discs of special design made of hard steel has been made available in this country by the firm of Roca & Guix, S. L., of Barcelona, Spain. The mill reduces rubber scrap to fine powder form suitable for mixing with ordinary compounds for molding rubber goods. Rubber powder, of a fineness down to 40 mesh screen, can be produced at the rate of 100 to 140 pounds per hour in one operation. The mill is of simple con-



struction, requires 6 to 10 h.p. to operate, is water cooled, weighs 750 pounds, and is automatically fed. It is also adaptable for grinding rubber substitutes or factice. M. Pancorbo, 155 John Street, New York City, acts as United States selling agent for the Roca & Guix grinding mill.

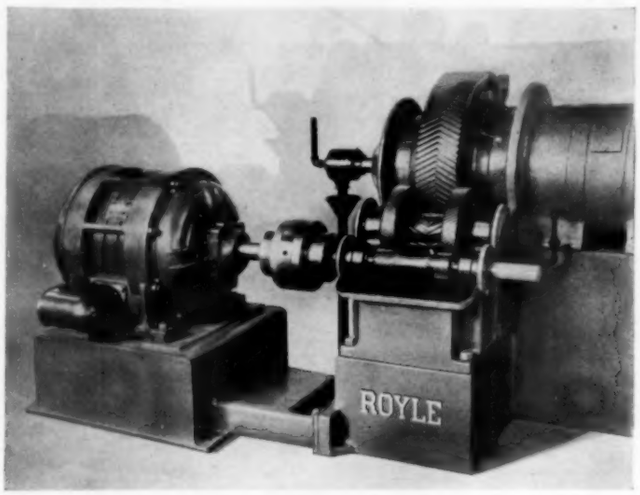
## Club Aluminum Electric Homogenizer

SPECIFICALLY designed for use by small manufacturers, manufacturing chemists and for laboratories, the Club Aluminum Products Company, Chicago, Illinois, has introduced an electric homogenizer adapted to a wide range of uses. It is manufactured in two bowl capacities,

6 and 10 quarts, respectively, and is intended for emulsifying liquid mixtures incorporating ingredients of uneven specific gravity including such mixtures as liquid rubber compounds, dyestuffs, oils, paints, etc.

## Royle Herringbone Gear Drive

A SERIES of herringbone drive machines have been added to the line of extruders manufactured by John Royle & Sons, Paterson, New Jersey. The design is complete with a mechanical oil distributing system to all points, a roller thrust bearing, oil seal, and inspection panel. Im-




provements to the stock screw cooling system include an open funnel which the return drains into visibly. Royle Machines Nos. 2, 3, 4 and 5 are ready in this improved design, adapted to tubing, covering, and straining service.

## The Hoeppler Viscosimeter

THERE are two popular methods practiced by the rubber industry for measuring the viscosity of latex in centipoises or units, i.e., the "Pipette" and the "Falling Ball" methods. In the latter method, said to be the more accurate of the two, the Hoeppler Viscosimeter, merchan-

dised in this country by the Fish-Schurman Corporation, of New York City, has been found to be particularly suitable for the measuring of the viscosity of latex. In practice, castor oil has been found especially useful in stand-

ardizing the Hoeppler Viscosimeter, its viscosity being taken as 14.5 c.g.s. units (centipoises) at 15.5° C. The instrument has a set of six balls enabling a range of viscosities from 0.01 to 1,000,000 centipoises which includes viscosities of both gases and of heavy, thick liquids. The wide range of viscosities measurable with this instrument eliminates the need of making measurements at other than the standard 20° C. temperature. Heavy, viscous steam cylinder oils and semi-fluid tars can be handled in it without heating, in addition to latex which is a milky liquid. The Hoeppler Viscosimeter, however, may be equipped with an electric heating device, heat being necessary for the determination of viscosity-temperature curves. Standard Model B Hoeppler Viscosimeter (illustrated herewith) is the model adapted to the measuring of the viscosity of latex.

## Taylor "Valv-Precisor"

UNDER many conditions it is difficult to secure correct positioning of valve discs or to maintain a desired accuracy of control unless special control systems designed primarily to accurately compensate for changes in load, etc., are installed. In answer to the demand for closer control of processing the Taylor Instrument Companies,

Rochester, New York, have incorporated the precision-valve-action feature, a vital factor in certain special control systems, into a separate instrument for applications where load changes are not a problem but where valve-stem friction and diaphragm-motor hysteresis must be overcome to obtain precision control. The new instrument is known as the Taylor "Valv-Precisor." According to its manufacturer, this instrument enables any air-operated controller to position the valve disc fifty times more accurately when opposed by valve-stem friction and diaphragm-motor hysteresis. It is recommended on all processes which have time lags or heat capacities demanding a low or medium controller sensitivity, provided that load changes are negligible or infrequent. The "Valv-Precisor" is compact and may be mounted on any diaphragm motor and valve. It can be used in conjunction with any air-operated controller on which a rigid connection can be made to the valve stem, a 25 lb. per sq. in. air or gas pressure being recommended for most efficient operation. An indicator which shows the actual percentage of valve opening is visible through a small glass window in the new instrument.

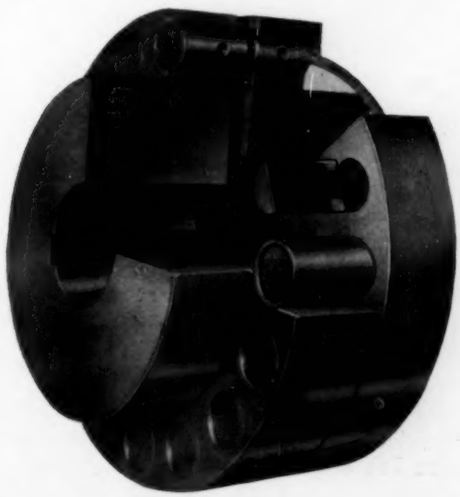
## Federal Dial Comparator

PROVIDING for finer tolerances, Model 110 Clear Vision Dial Comparator has been put on the market by the Federal Products Corporation, Providence, R. I. The new comparator measures a half of 1/10,000 of an inch clearly, according to its manufacturer, and uses a Model 95 Clear Vision Indicator. The dial is graduated to one half of 1/10,000 and each one of these graduations measures .1175 between lines, or .235 for each 1/10,000 graduation. The comparator itself is rigid. The indicator is raised or lowered by means of a right hand knob (as seen in the illustration herewith). It is clamped in position

by means of a left hand knob with a minimum amount of change in position. The lower anvil is raised and lowered by means of a large diameter ring which bears upon ball bearings. The thread is a 24 pitch thread which gives a micrometer adjustment to the anvil. The new instrument is compact and has a streamlined design.

## Improved Francke Flexible Coupling

TO MEET the new operating conditions which have occurred in the field of mechanical power transmission within the past few years, the John Waldron Corporation, New Brunswick, New Jersey, has announced several improvements in the design and materials of the

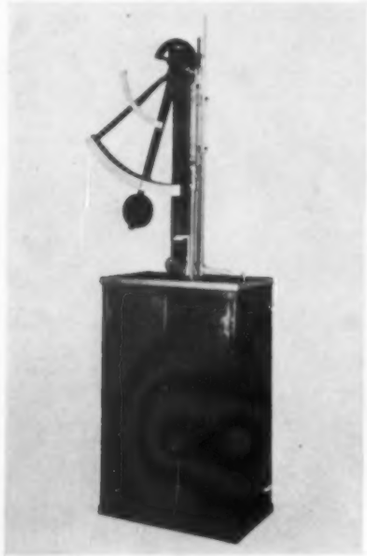


Francke Flexible Coupling. All Francke Coupling flanges, with the exception of the larger sizes which are molded of semi-steel, are now being made of a forged high manganese alloy steel. Self-lubricating, wax impregnated

bronze bushings have replaced the former dry bushings, the new ones having highly polished bearing surfaces which provide a large contact area. Little resistance is offered to the end-wise movement of the shafts of the connected machines when under load due to the self-lubricating bushings. In the design of the cross pins the crucible spring steel laminations are held within the keepers. The center portion of the cross pins, which passes through the perforation in the laminations, is now made glass hard. The ends of the cross pins are expanded into the tapered recesses of the keepers making it practically impossible for them to become loose. With these improvements the Francke Flexible Coupling is said to be as trouble-free as possible.

## Amthor Tensile Strength Tester

CONSTRUCTED on the pendulum principle in conformity with standard specifications, the Amthor Testing Instrument Co., Inc., of Brooklyn, N. Y., recently introduced the Universal Tensile Strength Tester. It is driven by a 1/6 h.p. constant speed motor which provides the official pulling clamp speed for rubber. It is equipped with standard clamps for holding the A.S.T.M. dumbell test strips without binding or bruising the specimen, with slippage eliminated. Limit stops are automatic. Tensile strength and elongation are determined simultaneously.



The lower 24-inch radius quadrant scale has a double graduation for load, one covering the maximum capacity desired, the other being graduated from 1/5th to 1/2 the maximum to give finer readings for specimens of low tensile strength. A vertical elongation scale is graduated in inches, all graduations being made to specifications. The tester may also be geared to produce the proper pulling speed and equipped with interchangeable clamps for wire. It can be made to standard specifications for testing paper, cordage and other flat materials besides rubber. Maximum capacity is 300 pounds.

## Foxboro Pressure Gauge

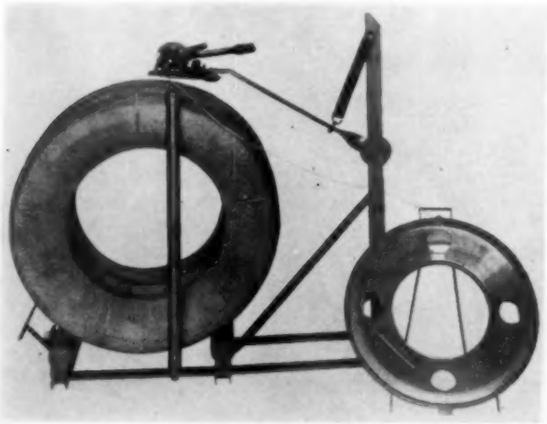
THE development of a new gauge to measure absolute pressure has been announced by the Foxboro Company, Foxboro, Mass. The instrument has a new method of compensating for changes in barometric pressure that is said to assure correct readings at all times. All unnecessary linkage from the actuating movement has been eliminated. The gauge is protected against overrange and contains no liquid to spill or lose its seal.

## Gerrard Wire Tying Machines

SUITABLE for specific application in the rubber industry, the Gerrard Company, Inc., of Chicago, Illinois, presents a number of improved wire tying machines. Model TA, weighing three pounds, is applicable to tying rubber garden hose. Said to be the simplest

Gerrard Model TA

metal binding machine on the market, this model uses wire in coils, thus avoiding waste, a slight stroke backward and forward circling and securely fastening a coil of wire around any section of coiled hose. As many ties may be made as desired, four generally being deemed sufficient for safe handling and shipping. Another type, termed Model TI, weighing eighteen pounds, is intended for heavier duty but operates in the same fashion. This model is intended for general factory use. A special model, known as the TT Tire Bundler, is produced by the company for that express purpose. A special rack is provided in which several tires are held firmly in place while the wire-tying function, performed by a Model TI machine, is accomplished. The wire, of course, is tied around already paper-wrapped tires, thus forming a substantial shipping unit easier to handle. Gerrard also supplies a



TT Tire Bundler

variety of additional models for various purposes all of which are intended to aid and improve packaging and shipping methods for both domestic and export purposes. Wire-tired packages, advises the company, are acceptable for U. S. mail.

# Book Reviews

MY WORLD TRIP. By Dr. E. A. Hauser. Published by Gummi- u. Asbest-Zeitung, Vienna, Austria. English section—26 pp. $1.00. (Available from the Book Department, THE RUBBER AGE)

Consisting of sections in English, German and French, this book is devoted to the personal observations of the author during his recent world-wide tour. A recognized authority on latex, it is natural that Dr. Hauser was particularly interested in the new uses of latex in manufacturing processes and he records observations in the United States along these lines in footwear, wires and cables, thread, and many special applications. In Japan Dr. Hauser was impressed by the modern manufacturing methods in use and states that they differ from the best installations only in adaptations "necessary to the Japanese manner of living and working." He reports that almost all manufacturing implements required are also "Made in Japan," including moving belts for footwear manufacture, four-roll calenders, large cutting drums, watch case vulcanizers, and others. Specific reasons for this vast improvement in the production of Japanese rubber goods are extolled by Dr. Hauser. Rubber manufacturing in China at present is in a poor condition, but the author predicts an "unseemingly unlimited market" for the future. Impressions of Malaya and Ceylon are included in the book, together with a brief discussion of the working of restriction. For a quick view of the panorama of rubber, "My World Trip" is recommended to all rubber men.

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A SECOND PRIMER. By Samuel Crowther. Published by the Chemical Foundation, Inc., 654 Madison Avenue, New York City. 60 pp.

Although in his introductory paragraphs Author Crowther states that he is presenting no "charges made for any partisan political purpose" but rather "plain statements of fact . . . sustained by conclusive evidence" this book is a direct attack against the current handling of the foreign trade situation by the Secretary of State. The facts, placing this country in a poor light, are simply presented with little editorializing but with frequent analogical interspersions. In concluding his observations the author points out that "foreign trade may be either an asset or a liability" and suggests that we (the people) bring the entirety of our foreign trade transactions into comprehensible bookkeeping form and publish the figures monthly, that we repeal the Trade Agreements Act and substitute a statute providing for reciprocal agreements (the main objectives of which will be to collect the war debts owing to us) and, finally, that we readjust upward the tariffs wherever foreign competition is interfering with American production.

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BROWN AIR OPERATED CONTROLLERS. Distributed by the Brown Instrument Company, Philadelphia, Penna. 24 pp.

Profusely illustrated, this catalog describes a series of controllers for temperature, pressure, flow and liquid level. Construction features and adjustment simplicity are stressed. "Tuning in" the throttling range, automatic reset, and the interchangeability of control units are explained. The Brown Company recently introduced its Air-O-Line series of control instruments.

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GEAR TYPE FLEXIBLE COUPLINGS. Distributed by the John Waldron Corporation, New Brunswick, N. J.

The several types of flexible couplings manufactured by Waldron, including the medium duty and torque ring couplings, as well as the Francke coupling, are briefly described and illustrated in this leaflet. Applicability of each type is clearly indicated from the descriptive material.

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WALDRON SILENT STEEL GEARS. Issued by the John Waldron Corporation, New Brunswick, N. J.

Construction and advantages of the Silent Steel gears manufactured by Waldron are given in this leaflet, which includes a systematic diagram depicting the indicated advantages. The gears are all steel and are said to last three or more times longer than non-metallic types.

CHEMICAL ENGINEERING CATALOG. (Twentieth Annual Edition.) Published by the Reinhold Publishing Corp., 330 West 42nd Street, New York City. 864 pp.

This 1935 edition of the process industries' catalog has an increase of more than 100 pages over the previous edition. The separate index of laboratory and reagent chemicals, introduced last year, has been continued. The book section constitutes one of the most complete bibliographies of chemical technology in existence. As usual, the catalog includes classified indexes of equipment, laboratory supplies, heavy and fine chemicals, raw materials used in industries employing chemical processes of manufacture, and other subjects. All of the listings have been revised and brought up to date.

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RUBBER PEPTIZING AGENT No. 1. (Laboratory Report No. 193.) Prepared by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 9 pp.

A new product, which is the zinc chloride double salt of phenyl hydrazine, a peptizing agent, and to which the name Rubber Peptizing Agent No. 1 has been given, is described in this report. Experiments with methods of plasticizing rubber by Messrs. Williams and Smith of the DuPont research staff, leading to the introduction of the new peptizing agent, are discussed. Conclusions based on the use of RPA No. 1 in laboratory tests are given in detail, supplemented with several charts depicting its effects. Advantages to be gained through the use of the new agent are discussed in a summation of the report.

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TETRONE A. (Laboratory Report No. 157—Revised.) Prepared and distributed by the Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 13 pp.

The results of further laboratory tests with Tetrone A, a tetrasulfide containing three atoms of sulfur available for vulcanization, and which is primarily intended for vulcanization without added sulfur, are given in this revised laboratory report. Tables show the results of physical tests on certain compounds when cured for various lengths of time at different temperatures. Other tables show the results of oxygen bomb aging tests, physical tests, etc. Formulas for heat resisting insulated wire stock, using Tetrone A, and heat and oil resisting pure gum compounds are given. The report also includes recommendations for the use of the tetrasulfide.

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CHEMCRAFT RUBBER CHEMISTRY MANUAL. By Jermain D. Porter. Published by the Porter Chemical Company, Hagerstown, Maryland. 76 pp.

Prepared for the rubber novice, and accompanying a brief catalog of Chemcraft chemistry, science-craft and mineralogy outfits sold by the company, this book treats with rubber from its early beginnings through current manufacturing practices. One chapter is devoted to the problem of sulfur mining and the use of sulfur in rubber compounding. Fifty-two experiments with rubber are included in the book which should make interesting reading for the novice.

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OVAC—A RUBBER ACCELERATOR. Prepared by the Naugatuck Chemical Division of United States Rubber Products, Inc., 1790 Broadway, New York City. 11 pp.

This report contains a complete description of Ovac, a new accelerator specifically developed by Naugatuck for tire treads "to meet the increasingly severe service conditions imposed on tires by the newer cars, trucks and buses." It is a blend of the thiazole derivatives of two specially selected aldehyde-amines. Characteristics and application of the accelerator are discussed. Its properties are summarized. Test recipes for tread stock are given, as well as tables depicting tensiles, flex-cracking, etc.

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NEVILLE COAL-TAR SOLVENTS. Distributed by the Neville Company, Neville Island Post Office, Pittsburgh, Penna. 36 pp.

Specifications, properties and a number of important applications of the Neville series of coal-tar solvents are given in this booklet. Data is included on such refined solvents as benzols, toluols, xylols and hi-flash naphthas. Crude solvents and plasticizing oils, including Nevinol, are discussed in detail. Nevinol is the recently introduced non-volatile solvent and plasticizer particularly suitable for use in chlorinated rubber coatings (Tornesit). Specific gravity and temperature conversion tables round out the information furnished.

# Editorial Comment

## Plant Modernization

FROM the regulations of eligibility recently issued by the Federal Housing Administration, at Washington, D. C., for loans to industrial and other enterprises, it is apparent that virtually all the heavy machinery used in the manufacture of rubber goods is eligible for purchase with credit advanced under the terms of the National Housing Act.

Robert B. Smith, Assistant to the Administrator, of the FHA, points out that these regulations provide that the equipment or machinery to be purchased should have a unit value sufficient to justify the application of time payments to its purchase. It should, further, be of a durable nature with a reasonable expectancy of useful life longer than the term of credit extended for its payment. Such equipment or machinery must be purchased and installed as a part of the equipment of a structure, or of the business conducted therein, within the United States and possessions.

Loans to industry, under a new special amendment, may be as much as $50,000. Loans for the purchase and installation of replacement parts for eligible equipment and machinery are insurable, but loans for repairs of machinery are not insurable, and therefore ineligible. The rubber manufacturer, small or large, may use this credit for the repair and modernization of his buildings, including the installation of such equipment as heating units and elevators. Use of such credit makes it possible to operate a thoroughly modern plant.

In a special note to THE RUBBER AGE, Mr. Smith makes it clear that the money for modernization or machinery purchase is *not* obtained from the FHA but from private financial institutions holding an FHA contract of insurance, such as a bank, a trust company or a building and loan association. Such loans may be secured for a five-year period and are payable in equal monthly installments. The FHA makes no attempt to control the charge of the lending agency other than to see to it that the maximum of $5.00 discount per $100.00 face value of a one-year note payable in equal monthly payments is not exceeded.

Two types of loans are available, i.e., where the credit does not exceed $2,000, the borrower simply supplies evidence to the lending agency that he is capable of making regular monthly payments and is of good business character; where amounts in excess of this sum are required the customary business principles apply.

Congress has fixed April 1, 1936, as the date of the expiration of the new amendment. Opportunity to take advantage of the FHA plan exists only until that date. The outstanding features of the plan are the extended payment period, the low cost, and the fact that no down payments of any kind are required. These terms differ vastly from ordinary lending terms. Rubber manufacturers who have contemplated the purchase of new equipment or machinery would be wise to further investigate this credit policy prior to its expiration date on April 1, next.

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## Tire Folly

FIGURES recently published by Goodyear depicting the tremendous mortality rate among tire manufacturers should serve as a warning to the thirty-two manufacturers still in the picture. The mortality rate in the last decade has been approximately 1000%. And the depression cannot be blamed entirely for the staggering figures. More probably the "depression" within the industry is largely to blame.

The tire manufacturers seemingly cannot stick together long enough to adjust a poor situation. Last year some hope was seen in the agreed-upon decision to sell tires as original equipment at 10% above cost as compared with previous years when such tires were sold at cost only. This year the industry has done a *volte-face* and is again back to selling them at cost.

In the retail tire field conditions are not improving. Discounts amounting to 60% from list prices are freely being quoted. Apparently the purpose of the remaining tire manufacturers is to continue a high mortality rate until some day only four or five will be left in the picture to supply America's needs. If current practices are continued, to use the vernacular, it won't be long now!

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## Proper Packaging

THE recent receipt of an attractively-printed booklet termed "Profitable Packaging," a review of which will appear in an early issue, brings to mind the importance of packaged rubber goods. Too many manufacturers in the industry overlook the sales advantages gained through the employment of proper packages. By the term "proper packages" we do not imply multi-colored cartons, nor ultra-tricky folding boxes, but rather packages specifically designed for a pertinent purpose.

Space does not permit a treatise on the subject of packaging rubber goods. Instead we urge that all rubber manufacturers give more and fuller consideration to their 1936 packaged lines. And remember, there are dozens of package designers whose sole job it is to turn out a package design aimed at a specific market. Their fees are reasonable. Their services, in many instances, invaluable. It will pay you to learn more about proper packaging through package designers.

CURRENT • NEWS of the Rubber Industry

NOVEMBER, 1935

## FAVOR FIRESTONE IN PATENT LITIGATION

***Court of Appeals Upholds Firestone in Alleged Patent Infringements Claimed by U. S. Rubber on Flat-Band Processes and Five Others***

Four years of litigation between the Firestone Tire & Rubber Company and the United States Rubber Company were brought to a temporary close on October 10 when Judges Moorman, Hicks and Simons, of the Sixth Circuit of the United States Circuit Court of Appeals, at Cincinnati, handed down a decision granting Firestone a "substantial" decision by ruling non-infringement of six out of seven patents involved in the cross-suits. The patents in litigation included the Hopkinson, or so-called flat-band method of tire construction, a method widely used in the industry.

In June, 1928, U. S. Rubber and Goodrich, as co-plaintiffs, filed a complaint against Firestone alleging infringement of eight patents containing approximately 140 claims. Goodrich later transferred its involved patents to U. S. Rubber receiving a portion of collected royalties only. A special master appointed by the court heard testimony over a long period of months starting in January, 1932. Two years later, in January of 1934, Judge Jones of the U. S. District Court, at Cleveland, handed down a decision holding that Firestone had infringed many of the patent claims. Both Firestone and U. S. Rubber appealed the decision.

At the first trial, the alleged patent infringements were reduced from eight to seven, while claims were reduced from 140 to 88. The Court of Appeals upheld Firestone on 85 claims and six of the patents, including the flat-band construction method. The seventh, or Abbott Patent, involving three claims, pertaining to a form of vacuum box used as a tire shaper, was held to be infringed, but was dismissed "without prejudice" to U. S. Rubber on the grounds that Firestone had discontinued the infringing process.

In dismissing the Hopkinson patent infringement claims, the Appeals Court held that "all of the claims in issue cover a method for making a tire casing by first building its elements into pulley band form and then shaping to tire form by distending the band at its center and bringing the edges toward each other. . . . Hopkinson was not the first to wind fabrics flatly upon a drum instead of a core in the manufacture of casings for pneumatic tires. Doughty, in the building of bicycle tires for the Dunlop Company in 1898, undoubtedly wound his casing fabric on a flat drum."

Other patents held non-infringed included one of Gammeter's covering a process and apparatus for shaping a pulley band to tire form by fluid pressure; the Sloper patents for a method and apparatus for shaping tires by the use of super-atmospheric pressure applied within the tire band; the Hopkinson re-issue patent of 1929; and others.

The court further held that "the defendant (Firestone) having prevailed substantially in its appeal, and wholly in the cross-appeal, will be allowed its costs." In any event, since the amount of damages involved, had the original decision prevailed, is highly problematical, and would undoubtedly have led to further litigation. For this reason the Appeals Court's decision is considered purely a "tactical" outcome.

U. S. Rubber originally sought injunctions to restrain further use of the patents by Firestone, accountings to determine the profits accrued through their use, and judgment of damages as a result. It is believed that any loss of royalties incurred by U. S. Rubber because of the decision would be slight. In the company's registration statement to the Securities and Exchange Commission it was clearly stated that royalties received in 1934 were "negligible in amount."

### Pneumatic Tires Compulsory!

Under the terms of a proposed ordinance filed with the Denver (Colorado) City Council in mid-October all motor vehicles and trailers without pneumatic tires would be banned from the city's streets and alleys. If favorably approved by the Council the ordinance would become effective January 2, 1936. The proposal was made in the interests of noise abatement and citizen convenience. According to reports from Denver it will probably secure sufficient votes from council members to become an early law. Similar legislation is being prepared in several other leading cities on the same basis.

## HAUSER AND GROTE AT R. I. CLUB DECEMBER 5

Plans have just been completed for an interesting meeting of the Rhode Island Rubber Club to be held at the Narragansett Hotel, Providence, on Thursday evening, December 5. The speaker of the evening will be Dr. E. A. Hauser who will give some interesting sidelights on his recent world trip. H. Walter Grote, of the United Carbon Company, will also be on hand to demonstrate a few of his latest card tricks and psychological subtleties. The meeting will be preceded by a bowling match at 5 P. M. at the Washington alleys. Tickets are $1.50 each and may be obtained from F. E. Rupert, Sec.-Treas., who may be reached at the Anaconda Wire & Cable Company, Pawtucket, R. I.

## GOODYEAR AVOIDS LABOR DISTURBANCE

***Attempt to Place Dispute Over Hours Before the Department of Labor Is Defeated by a One-Vote Margin in the Meeting of Goodyear's Senate***

What might have been serious labor trouble at the Goodyear plant in Akron was narrowly averted early this month in connection with the company's announced intention to increase the six hour day to an eight hour day.

Appealing to all Goodyear workers in a special issue of the *Wingfoot Clan*, company house organ, President Litchfield stated that the objective of the company in attempting to increase the hourly shifts was "to pay a monthly wage in 1936 based on an average of 36 hours per week during the year which will give a standard of living equal to, or higher than, that of the prosperous years of 1924-1929 when the hours of work averaged 15% greater."

A motion to place the dispute over hours, contested by the Goodyear Industrial Assembly, as well as the Goodyear local of the United Rubberworkers of America, before the department of labor and to ask for Federal supervision of a factory-wide employes' vote on the six hour versus eight hour day, which might have led to serious labor disturbances, originated in the House of Representatives of the Assembly where it passed by a vote of 14 to 11, several members declining to vote. The Assembly Senate, however, by a vote of 10 to 9 defeated the measure thus killing the move. The vote of the Senate's president, William L. Cash, decided the issue. Mr. Cash explained his vote by stating that he did not believe an appeal to the government was called for at this time.

Although Goodyear attempted to put the eight hour shift into practice in several departments, it is understood that such departments are returning to the six hour day. Principal possibility of the revival of the issue seems to lie in the company's future policies.

There is a possibility that the recently-elected members to the Goodyear Industrial Assembly may re-open the issue when they take their seats in the early future, but such possibility is doubted by Goodyear executives.

There is still pending the action to be taken by Secretary of Labor Perkins on the request of the Goodyear local of the United Rubberworkers Council for a neutral fact-finding board to study the hours question.

Shortly after this request was made, P. W. Chappell, United States labor department conciliator, was sent to Akron, and has since conferred with officials of the union, assembly and Goodyear. His collected data was to have been presented to Secretary Perkins for action.

## DR. SHEPARD ADDRESSES JOINT CHICAGO MEETING

One of the largest meetings of the Chicago Rubber Group ever held took place on Friday evening, October 25, at the Stevens Hotel, in Chicago, with more than 750 persons in attendance. The meeting was held in conjunction with the Chicago section of the American Chemical Society, the first such cooperative meeting between the two groups. Dinner was served in the Boulevard Room of the Stevens but due to the large attendance the technical session was held in the North Ballroom.

Mr. Arthur Guillaudeu, chairman of the Chicago Section, A.C.S., introduced Dr. Carl E. Frick, chairman of the Chicago Rubber Group, who in turn introduced the only speaker of the evening, Dr. Norman A. Shepard, Director of Chemical Research for the Firestone Tire & Rubber Company, of Akron, who was recently elected to the chairmanship of the Rubber Division, A.C.S.

Speaking on "The Onward March of Rubber," Dr. Shepard described the chemicals and processes generally used in the rubber industry today, with special emphasis on the more recent developments, including such topics as vulcanizing agents, reclaimed rubber, acidic compounding ingredients, organic accelerators, reinforcing powders and anti-oxidants. He stressed the chemical structure of various anti-oxidants more generally in use.

Dr. Shepard's address also covered latex and synthetic rubbers. He described and demonstrated a new process in which latex, heat sensitized with certain inorganic salts, gives deposits on heated forms as thick as 1/10th of an inch with a 15 to 20 second dip. In discussing synthetic products he talked about the so-called "polycyclo-rubbers," chlorinated rubbers and hydro-chlorinated rubbers.

In concluding his address, Dr. Shepard described a tire which was made by Firestone for experimental purposes without any natural rubber or cotton. The rubber was replaced with DuPrene and the cotton by rayon made from wood pulp. He stated that this tire was not practical at present but merely an indication of the progress in rubber technique and development work in the chemical section of the industry. By means of his own public address system Dr. Shepard's talk was clearly heard by everyone in the room as well as by those in the overflow in the adjoining corridor.

### Mansfield Prospects Bright

Prospects for 1936 are "much better than for the last several years," according to George W. Stephens, president and general manager of the Mansfield Tire & Rubber Company, Mansfield, Ohio. Mansfield has recently completed negotiations with several large tire distributors throughout the country for 1936 production and will step up operations 25% above any recent peak seasons to meet an anticipated increased demand for its tires. Installation of new equipment to cover increased requirements has already started.

### Open New York City Office

General sales offices for the Elm City Rubber Company, of New Haven, Connecticut, have been opened in the Flatiron Building, 175 Fifth Avenue, in New York City. A permanent display of products will be maintained at the new sales headquarters, according to Robert Blake, Elm City vice-president.

### Rubber in Plymouths

The new 1936 Plymouth cars, exhibited at the recent Automobile Show held at the Grand Central Palace, in New York City, use more than 400 rubber parts totaling approximately 50 pounds of rubber. The bodies of the new models are cushioned on rubber for the first time. Composition rubber shims are placed between the body and the frame to insulate the body against road noises. Plymouth exhibited nine models in its 1936 line featuring a wide variety of important improvements.

### Goodyear Buys Panama Land

As a site for experiments in rubber growing, the Goodyear Tire & Rubber Company, Akron, has purchased 2,500 acres of land in the Republic of Panama. This purchase has been expected for some time. About 1,000 acres in the Gatum Lake sections are being planted, Goodyear experts having found the topography excellent for experimental purposes. Goodyear was restricted in its desire to purchase a larger tract by a Panama law prohibiting any individual or corporation from owning more than 2,500 acres of land. A similar law exists in the Philippines where Goodyear also owns acreage of the same amount.

### Set Boston Group Meeting

A meeting of the Boston Rubber Group will be held at the University Club, 40 Trinity Place, in Boston, on Tuesday evening, November 19th, with dinner scheduled for 6:30 P.M. The program calls for a report by the secretary-treasurer, election of officers for 1936, and an address by Col. Walter C. Baker, C.W.S., Chemical Officer, First Corps Area, on the subject "Developments in Chemical Warfare." Col. Baker will illustrate his talk. Dinner tickets, at $1.50 to members of the Boston Group and $1.75 to non-members, can be secured from W. J. R. Hauser, secretary-treasurer, in care of the Heveatex Corporation, Melrose, Mass.

### DuPont Awarded Chemical Medal

The 1935 award for chemical engineering achievement, donated by *Chemical and Metallurgical Engineering*, has been won by the organic chemicals department of E. I. du Pont de Nemours & Company, Wilmington, Delaware. The announcement was made by Albert E. Marshall, president of the American Institute of Chemical Engineers, on October 22. Presentation was awarded DuPont because of "successful large-scale production of synthetic rubber, synthetic camphor and a variety of other essential organic chemicals and dyestuffs."

### Transfer Testing Equipment

Goodyear Tire & Rubber Company, Akron, has transferred the bulk of its tire road testing equipment, including 16 cars and trucks, to Litchfield, Arizona. A personnel section of 42 men including drivers, mechanics and engineers, has been shifted to the new testing grounds. This winter is the twenty-second consecutive year Goodyear's highway fleet indulges in tire proving ground activity.

## EXPERIMENTS CONTINUE ON SYNTHETIC RUBBERS

Experiments in connection with the improvement of synthetic rubbers is continuing at a rapid pace both in this country as well as in several foreign countries. The primary object at present is to bring the production of synthetic rubber nearer to the price quoted on natural rubber, although in many instances properties contained in the synthetic products are said to be superior to that of natural rubber.

In addition to its experiments with DuPrene, the DuPont laboratories are working on another synthetic product which is to be made from mono-vinyl-acetylene by a new process which makes use of a temperature 100° C. below zero and which is expected to provide a material nearer in chemical constitution and molecular structure to the natural hydrocarbon. DuPont recently completed a factory at Deep Water, New Jersey, for the exclusive manufacture of synthetic rubber. (Further details elsewhere in this issue).

The construction of a factory for synthetic rubber production has been started at Piesteritz, near Wittenberg (Elbe), Germany, where the Bayerische Stickstoffwerke A.G. is making carbide for the manufacture of cyanamide. Completion of this factory is expected later this year and experimental work will be begun immediately to improve upon present processes.

In Japan the Tokyo Chisso Kogyo K.K. (Oriental Nitrogen Fertilizer, Ltd.) has announced its intention to produce synthetic rubber and motor gasoline from calcium carbide but at this writing it is not definite whether either of these projects will be carried out.

According to reports from Russia, where the All Union Synthetic Rubber Syndicate operates six factories all engaged in producing synthetic rubber, tires are now being produced from such rubber which stand up for 4,500 miles under ordinary usage. These tires are said to be produced in commercial quantities. It is said that about 20,000 tons of synthetic rubber have been produced in Russian factories since the beginning of this year, with another 5,000 tons expected prior to December 31.

### Belittle Tire Price War

Akron tire manufacturers were inclined to dismiss persistent reports of the outbreak of still another price war last month. Tire dealers in New York City are said to be no longer concealing their reductions from competitors. The usual price reduction consists of "four-tens," dealers making four successive 10% discounts from list prices, approximating a straight 50% reduction. Cheap tires entering the market are believed to be responsible for the outbreak. F. A. Seiberling, president of the Seiberling Tire & Rubber Company, Akron, stated that it was purely a "local skirmish" and predicted an early halt. A. A. Garthwaite, vice-president, Lee Rubber & Tire Corporation, Conshohocken, Penna., insists that an increase in prices of tires in the next few weeks is "inevitable." He believes the industry will shortly agree upon a plan of merchandising "which will prove sound to the manufacturer, the dealer and the public."

A recent meeting between representatives of Goodyear, Goodrich, U. S., Firestone and General, in Akron, was reported to have been concluded with an unsuccessful attempt to agree upon methods for eliminating price-cutting contests.

## CHEMICAL EXPOSITION OPENS ON DECEMBER 2ND

The 15th Exposition of Chemical Industries will open on December 2nd at the Grand Central Palace, in New York City, and will continue for the balance of the week. Timely, with complete new exhibits in practically every field of chemical manufacturing and research, the exposition, according to the management, will offer the best visual proof of the recovery of American industries as a whole.

Exhibits will include samples of organic liquids obtained from polymerization of gaseous hydrocarbons; aromatics, such as benzol and xylol, made from petroleum gases; precision instruments for control of pressures, temperatures, and time; laboratory equipment of all types; plant equipment; and others.

The 1935 exposition will be divided into a number of sections including the following: metals and alloys, raw materials, natural resources, materials handling equipment, educational exhibits, containers and packaging, chemicals and chemical products, etc. Rubber technologists will find much of interest and value in the various exhibits.

The keynote of the exposition will be an exhibit of the American Chemical Society which will present an extensive and interesting pageant of products titled "Children of Recovery." Concrete evidence will be given that research pays despite business conditions. This "evidence" will consist of more than one hundred different new products of research marketed in 1934-5. These new products will be exhibited under the headings of "chemistry coordinates industry" and "chemistry catalyzes commerce." At the last exposition, in 1933, the theme of the A.C.S. exhibit was "Children of Depression." The new presentation on recovery should make an interesting comparison.

## U. S. RUBBER EXPORTS SHOW DECLINE IN VALUE

Exports of rubber products in September from the United States amounted to $1,746,518, according to the Bureau of Foreign and Domestic Commerce, which was 6 per cent less than the figure for August, 1935, and 5 per cent less than for that of September, 1934.

Total exports of rubber products in the first 9 months of 1935 were valued at $16,369,676, 1 per cent less than the figure of $16,547,314 for the first 9 months of 1934, and 35 per cent greater than that of $12,104,315 for the same period of 1933.

A decline of 8.5 per cent in exports of tires, inner tubes, and tire sundries—from $9,537,263 to $8,723,904—was almost entirely responsible for the lower exports in the first 9 months of 1935 than in the comparable period of 1934; other losses were registered in rubber and waterproof fabrics (from $580,470 to $529,700, 8.7 per cent), and in druggists' rubber sundries and specialties (from $952,143 to $931,870, 2.1 per cent).

Increased trade in the current 9 months, as compared with the first 9 months of 1934, was reported in all other general classes of rubber goods exports, as follows: Rubber footwear, from $479,535 to $641,691, 34 per cent; mechanical rubber goods, from $2,234,603 to $2,341,417, 4.8 per cent; hard rubber goods, from $210,702 to $277,507, 32 per cent; semi-manufactured rubber items, from $1,632,893 to $1,722,691, 5.5 per cent; and miscellaneous rubber goods, from $919,605 to $1,200,896, 31 per cent gain.

The comparison is much less favorable if based on the quantity instead of the value of rubber goods imported and exported, the import figures for 9 months showing an increase of 8 per cent and the export figures a decline of 13 per cent compared with 1934. The unit prices of imports were reduced 19 per cent, while unit prices of exports were increased almost 14 per cent, according to declared values.

## Change Thwing Company Name

The Thwing Instrument Company, of Philadelphia, has announced a change in name to that of the Thwing-Albert Instrument Company. The change in name involves no change in ownership, management or policy. Mr. E. J. Albert, whose name has been joined with that of Dr. Charles B. Thwing, has been associated with the concern for 17 years as manager and secretary. The Thwing-Albert Instrument Company are makers of pyrometer apparatus and paper testing instruments.

## MEMA Wholesalers To Meet

The Motor and Equipment Wholesalers Association will hold a series of convention sessions at the Claridge Hotel, in Atlantic City, on Friday and Saturday, December 6 and 7, just preceding the Annual Automotive Service Industries Show, to be held in the same city. The wholesalers organization is one of the underwriters of the latter show.

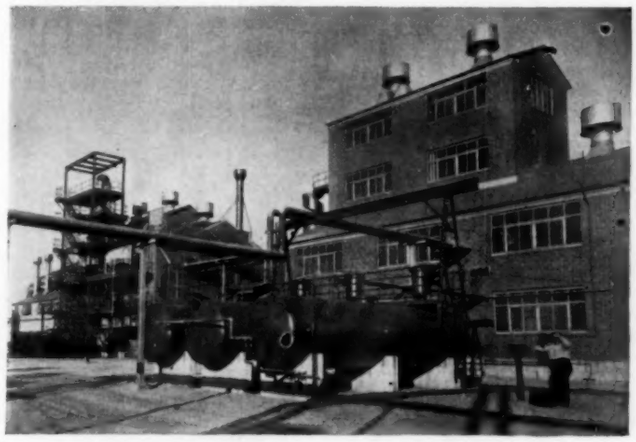
## Kelly Advertising Campaign

With the streamer, "Going Up All Over America," the recently reorganized Kelly-Springfield Tire Company, of Cumberland, Maryland, has launched a national advertising campaign which includes full pages in several leading national periodicals. Although no mention is made of the Goodyear interest, the advertising copy makes mention of "strong financial support." The Kelly concern takes credit for the production of the first molded pneumatic automobile tire in 1906, the first fabric tire in 1912, the first over-size cord tire in 1916, and the first modernized balloon tire in 1924. Recently it introduced its fatigue-proof, balanced tire. These factors are expected to play a part in the current advertising campaign.

## Form Midland Rubber Company

The Automotive Products Company, of Cleveland, recently took a long term lease, with a purchase option included, on the property and factory of the former Salem Rubber Company, in Salem, Ohio. The acquired factory will be operated by the Automotive concern under the name of the Midland Rubber Company. Automotive accessories, such as floor mats, running board matting, car heater and radiator hose, and other items, will be manufactured, in addition to a general line of mechanical rubber goods. G. W. Schwan, formerly with the Quaker City and Goodrich rubber companies, will act as manager of the Midland factory.

## DUPONT COMPLETES PLANT FOR SYNTHETIC RUBBER



DuPont's Synthetic Rubber Plant at Deep Water, N. J.

Completion of a new factory for the production of synthetic rubber, which has been under construction for the past year, has been announced by the Rubber Chemicals Division of the E. I. du Pont de Nemours & Company. The factory, located at Deep Water, New Jersey, opposite Wilmington, Delaware, where all shipping facilities are available by both rail and water, is expected to produce at the rate of approximately one million pounds of DuPrene annually.

The building of the new plant was made necessary by an increased demand for this synthetic rubber. Since the announcement of DuPrene in 1931 a great amount of technical work has been done in many industries in applying it to their needs. Since DuPrene compositions will withstand higher temperatures than those of natural rubber and are more resistant to oils and chemicals and have less tendency to crack when repeatedly stretched and flexed, they soon found wide utilization.

The petroleum industry has become an important buyer of such compositions. The company reports that they are used as inner liners for tubes in oil and gasoline ship loading hose, gasoline service station hose, gasoline tank truck hose and hose for delivering fuel oil to the home or factory. Packer rubbers and pump pistons of DuPrene composition are used in oil well drilling, and the refineries use it in gaskets and packings.

The automobile industry has adopted DuPrene as a protective coating for ignition wires and for many rubber parts other than tires where heat and oil are encountered. The printing trade is using large quantities in printing rollers and offset blankets. The refrigerating industry also uses it in the manufacture of sealing devices, and aviation has adopted it for refueling hose and tank seals and for flexible oil line connections. In fact the company reports that all major industries have found uses for these DuPrene compositions.

# Financial News

## BOSTON HOSE AND RUBBER HAS DECREASED PROFITS

For the year ending August 31, 1935, the Boston Woven Hose and Rubber Company, of Cambridge, Mass., earned $82,406 after a charge of $192,508 for depreciation on plant and machinery, and provision for taxes accrued during the year. This net income is comparable with $113,852 earned in the preceding year.

After paying dividends on the preferred stock amounting to $45,000 and deducting losses on raw materials sustained during the year amounting to $17,748, the amount earned applicable to outstanding common stock was $19,658, which is equivalent to approximately 23 cents per share on 86,000 shares. From this amount, however, a further sum of $15,907 must be deducted arising from the change in the date of assessment of local property taxes from April 1 to January 1 which resulted in an additional three months' accrual of such taxes. In the preceding period Boston Woven Hose and Rubber paid 75 cents per share on 86,000 shares.

Sales for the year increased $340,831 or 7.8%. Poundage shipped increased 1,844,435 pounds or 9.05%.

### U. S. to Redeem Gold Notes

The U. S. Rubber Company has called for redemption on December 1 all of its 3-year secured 6% gold notes, due June 1, 1936, at 100¼ plus accrued interest. On June 30, 1935, there were $4,225,600 of these notes outstanding against an original issue of $5,900,000. The gold notes were originally issued in 1933 to refund maturing obligations, holders of which accepted payment at the rate of 30% in cash and 70% of the face amount in the present notes. Payment on the redemption will be made on December 1 at the main office of the Chemical Bank and Trust Company, in New York City.

### Fisk Rubber Reports Loss

For the first nine months ended on September 30, 1935, the Fisk Rubber Corporation, Chicopee Falls, Mass., and subsidiaries, report a net loss, after taxes and other charges, of $149,495, which is contrasted with a net profit of $474,271 in the similar period of the previous year. Last year's income was equal, after 6% preferred dividend requirements, to 66 cents a share on 447,356 $1 par common shares. Current loss was reported despite an increase in dollar earnings from $7,742,977 in 1934 to $8,657,988 in 1935.

### 9-Month Profit for Thermoid

Thermoid Company, Trenton, N. J., and wholly owned domestic subsidiaries, report a net profit of $120,452 for the nine months ended September 30, 1935, after deducting interest, depreciation, Federal taxes, and other charges. This is equal to $3.96 a share on 30,417 shares of 7% cumulative convertible preferred shares on which there is an accumulation of unpaid dividends. The current profit compares with a net loss of $859 reported for the first nine months of 1934. For the September quarter Thermoid earnings were $1,375 after interest and depreciation but before deducting Federal taxes. Southern Asbestos, which is 97% owned by Thermoid, had a slight loss for the third quarter of the year, while Thermoid, Ltd., wholly owned Canadian subsidiary, showed a slight profit.

### Monsanto Increases Earnings

Monsanto Chemical Company, of St. Louis, Missouri, reports net profits available to common stock for the third quarter of 1935 at $884,550, or 89¼ cents a share on the 987,876 shares outstanding, which compares with 65¼ cents a share for the 1934 corresponding quarter, based on earnings of $566,195. For the nine months ended September 30, 1935, Monsanto earnings available to common stock total $2,732,999 or $2.76½ a share compared with earnings of $1,945,230 or $2.25 a share in the first nine months of the previous year. The 1935 figures include the earnings of the subsidiaries of the Swann Corporation which were acquired early in the year.

### Goodyear Increases Dividend

Quarterly dividends on the first preferred stock of the Goodyear Tire & Rubber Company, Akron, will be increased from 50 cents to $1.00 on January 2, 1936. The stock is a 7% cumulative issue. The increased dividend will be paid to stockholders of record November 30, 1935. Market reports show that the stock is now $9.00 in arrears in dividends.

### Profit for Electric Hose

Electric Hose & Rubber Company, Wilmington, Delaware, had a net income of $43,376 for the year ended on August 31, 1935, equal to $3.40 a share on 12,741 capital shares. This compares with $41,873 earned in the previous year which was equal to $3.29 a share.

### List Columbian Certificates

Columbian Carbon Company voting trust certificates for capital stock without par value, extended to 1940, were admitted to the New York Stock Exchange list on November 2.

### Issues Statistical Chart

Farr & Company, brokerage firm of 90 Wall Street, New York City, has issued a crude rubber statistical and price curve chart. The chart shows the trend of world stocks and the consequent price movements of rubber under the Stevenson Restriction Scheme and compares this with the situation existing under the present restriction plan. The current price curve follows the same general pattern in a modified form as that under the former scheme.

### Change in Company Name

The Gould Golf Ball Company, of Wakefield, Mass., has changed its corporate name to the Crystal Golf Ball Company. No other corporate changes have been made, the same officers remaining in their respective capacities. The company maintains offices and factory at 532 Main Street in Wakefield.

## TWO ADDRESSES FEATURE N. Y. GROUP MEETING

Two interesting papers, one of general interest and the other of technical importance, featured the annual Fall dinner and meeting of the New York Rubber Group, held on October 11, at the club rooms of the Building Trades Employers Association, 2 Park Avenue, in New York City.

Following the usual dinner a short business session was held at which it was announced that with the 1936 slate of officers two new posts were to be created within the group, these being a vice-chairman and a sergeant-at-arms. The date of the annual Christmas party of the group was announced for Friday evening, December 20, at which, in addition to the fun and frolic, nomination and election of officers will take place. C. R. Haynes, of the Binney & Smith Company, New York City, is in charge of preparations for the Christmas festival.

At the conclusion of the business session, O. M. "Bill" Hayden, of DuPont, introduced the first speaker, Carl Zieme, technical superintendent of the Republic Rubber Company, Youngstown, Ohio, telling the audience that Mr. Zieme has spent the last ten years with Republic and revealing his favorite hobby as miniature photography, all of which was preparatory to Mr. Zieme's address on "Unusual Uses of Rubber."

Mr. Zieme's address was punctuated throughout with slides made from photographs he had personally taken at the T.V.A. project at Knoxville, Tennessee, and at the Boulder Dam. The use of mechanical rubber goods at these two gigantic governmental undertakings were shown and explained by the speaker who pointed out the more difficult processes necessary to meet certain requirements called for in quarrying operations and dredging movements in connection with these projects. All of the photographs were taken by a miniature camera which Mr. Zieme exhibited to the audience at the end of his address.

The second paper, "Methods of Plasticizing Rubber," was prepared by Ira Williams and C. C. Smith, of the DuPont research staff, and was delivered by the former. The paper was devoted to a new softening agent known as Rubber Peptizing Agent No. 1 which was the result of experiments conducted by Messrs. Williams and Smith, During these experiments they learned that the addition of phenyl hydrazine and related compounds to rubber causes a peptization or breaking-down of the gel structure of rubber with much less oxidation than occurs when rubber is broken-down by mastication alone and with less expenditure of power. The new product is the zinc chloride double salt of phenyl hydrazine, a finely divided solid. Further details of this material will be found elsewhere in this issue.

Mr. Williams used several slides of charts depicting the effect of varying amounts of the new softener, effect of time heating, effect of storage temperatures, and others. The meeting ended with the conclusion of his address.

### Seeks to Recover Property

The Philadelphia Rubber Works Company, of Akron, filed a petition on October 31 in the Common Pleas Court requesting a court order to enforce delivery of personal property to it by the Henderson Tire & Rubber Company, of Bucyrus, Ohio. The Henderson concern recently experienced financial difficulties, the factory being temporarily shut down.

## UNITED CARBON HOLDS ANNUAL GET-TOGETHER

From East and West, South and North came the 540 guests who attended the fifth annual get-together of the United Carbon Company, held at Charleston and White Sulphur Springs, West Virginia, on Saturday and Sunday, November 9-10. The planned program of trips, sporting events and entertainment, coupled with the excellent accommodations of The Greenbrier—one of the outstanding resort hotels of the country—proved a combination which resulted in what was generally conceded to be one of the finest meetings of its kind ever held.

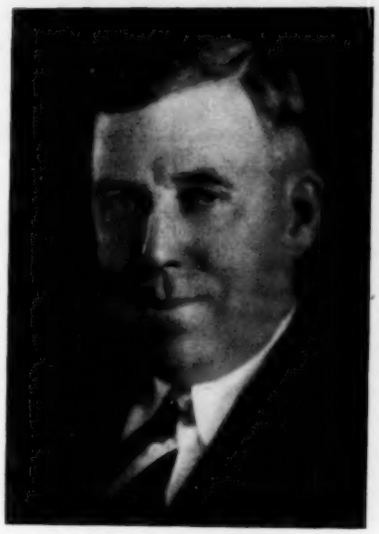
Two special trains brought guests from New York. Detroit and Akron, while additional cars added to trains from Chicago, Cincinnati and St. Louis took care of those who attended from the Mid-West. Many were taken direct to Charleston where the company's laboratories and offices were visited, and the balance went direct to White Sulphur Springs. All the guests, however, were brought together in time to attend the elaborate dinner in the Banquet Hall of The Greenbrier scheduled for Saturday evening.

In Charleston the visiting technologists were escorted by H. Walter Grote and Chief Chemist A. G. Roberts to the company's Control and Research Laboratory where they were shown the equipment and means used to test and control the quality of carbon black. Particular interest was shown in the recently added T-50 Test Outfit for testing rate of cure variations. This was originally developed in the United States Rubber Company laboratories but has now had several valuable improvements added by United Carbon engineers. The Industrial Research and Development laboratory was also visited where Dr. Emile de Stubner described the new equipment and explained some of the problems being worked on. Following a short trip to the company's offices and luncheon at the Daniel Boone, this group was taken by special train to join the balance of the party at White Sulphur Springs.

Golf, tennis, swimming, trap shooting, hiking, horseback riding, archery and ping pong were indulged in during the day by many in or about the ample grounds of The Greenbrier. Others took advantage of the invitation of Mr. and Mrs. Oscar Nelson to visit "Mörlunda," their recently acquired and remodelled farm house located about 12 miles west of White Sulphur Springs, where open house was held over the week-end.

Sparkling entertainment and interesting talks featured the annual banquet

North Portico Greenbrier Hotel.



OSCAR NELSON

which was preceded by an invocation by Rev. H. W. Rose, the "spiritual advisor" of the company. Oscar Nelson, president, then introduced W. B. Clark, one of the company's directors from Monroe, La., who acted as toastmaster. G. A. Williams, 1st Vice-president and Sales Manager gave a hearty welcoming address and was followed by W. C. Hull, Assistant Vice-president of the Chesapeake & Ohio Railroad who outlined the present plight of railroads especially as it affected the industrial and economic situation of the country.

***List of Other Speakers***

Other speakers were L. M. Buckingham, attorney and President of the Akron Chamber of Commerce, who gave a few revealing sidelights on the character of "Ginsberg" Floyd Meyers, the Akron representative of United Carbon; Harry L. Van Sickler, an attorney of Lewisburg and a neighbor-farmer who complimented Mr. Nelson on becoming a farmer in Greenbrier county—"one of the finest in the country . . . with unlimited resources in coal, limestone, agriculture, mineral springs, climate, fishing and hunting"; S. C. Coleman, of E. F. Hutton & Co., commercial bankers, who expressed his confidence in Mr. Nelson, Mr. Williams and in the company, "based on performances which have exceeded promises and predictions on production, sales and earnings"; George H. Martin. Senator from Kentucky, who told of the high regard in which Mr. Nelson is held in Kentucky where he is noted for fair dealing and for his contributions to the resources of the state; W. Chapman Revercomb, attorney of Charleston, who traced briefly the origin and growth of the United Carbon Company, and also paid tribute to the company officials and particularly Mr. Nelson to whom he gave credit for the position which United Carbon had taken "in the empire of commerce, for its glory and achievement due to the genius of Oscar Nelson."

The final speaker was Mr. Nelson who briefly expressed his appreciation for the many kind opinions expressed by the speakers.

Following the banquet, a dance was held in the Greenbrier Ball Room where enjoyment reigned for several hours to the strains of entrancing music. Among the guests were the wives of many of the technologists and company executives, which party in itself numbered 115. The women were entertained separately by trips, sports and a banquet of their own presided over by Mrs. Oscar Nelson.

The entertainment program was capably handled by H. Walter Grote, of the company, and W. S. Kelly, Jr., of the firm's New York advertising agency. The local reception and arrangements were taken care of by A. G. Treadgold, Auditor, and Arthur Hanson, Assistant Secretary.

A considerable number of the guests, which included many of the leading technologists and executives of the rubber, paint, ink and paper industries in the United States and Canada, stayed over Armistice Day, the balance leaving on Sunday evening after a full two-day enjoyment of hospitality on the part of Oscar Nelson and his corps of able executives.

## SEPTEMBER CONSUMPTION WAS 4.3% BELOW AUGUST

Consumption of crude rubber by manufacturers in the United States for the month of September is estimated to be 37,553 long tons, which compares with 39,242 long tons for August, 1935. September consumption shows a decrease of 4.3% below August although 24.1% above September a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for September, 1934 , was reported to be 30,258 (revised) long tons.

Imports of crude rubber for September were reported to be 34,569 long tons, a decrease of 10.6% below the August figure of 38,665 long tons, but was 19.9% over 28,835 long tons imported in September, 1934.

Total domestic stocks of crude rubber on hand September 30th are estimated at 326,236 long tons which compares with August 31st stocks of 329,548 long tons and 360,623 long tons on hand September 30, 1934.

Crude rubber afloat to U. S. ports as of September 30th is estimated to be 43,413 long tons as compared with 47,724 long tons afloat on August 31st of this year and 38,831 long tons afloat on September 30th a year ago.

September reclaimed rubber consumption is estimated at 8,774 long tons; production, 9,041 long tons; and stocks on hand, September 30, 1935, 18,260 long tons.

## AUGUST TIRE SHIPMENTS WERE 13% BELOW JULY

Shipments of pneumatic casings during the month of August, 1935, are estimated to be 4,739,259 units, a decrease of 13% below July, although 10% above shipments made in August a year ago, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for August was estimated to be 3,992,800 casings, an increase of 13.1% above July and 13% over August, 1934.

Pneumatic casings in the hands of manufacturers on August 31st are estimated to be 7,805,054, a decrease of 11.8% below stocks on hand July 31st and 10.3% below stocks on hand August 31, 1934.

The actual figures are as follows:

PNEUMATIC CASINGS

| | *Shipments* | *Production* | *Inventory* |
|---|---|---|---|
| August, 1935 | 4,739,259 | 3,992,800 | 7,805,054 |
| July, 1935 | 5,447,109 | 3,531,834 | 8,849,503 |
| August, 1934 | 4,308,270 | 3,532,631 | 8,697,151 |

# NEW ENGLAND NEWS

Schuyler J. Taylor, for some time general superintendent of the Russell Mfg. Company, Middletown, Conn., has relinquished that post to devote his time to special research. Gustav Walters has been appointed superintendent of the belting and automotive divisions and James A. Hendley superintendent of the webbing divisions. Messrs. Walters and Hendley have been assistant superintendents of their divisions.

President G. M. Williams, announcing the changes, reported "recent substantial contracts and orders for products of both divisions of the company, indicating a favorable trend in its sales volume."

Mr. Williams was recently elected president of the Brake Lining Manufacturers' Association at a meeting in New York. Another New England executive honored by the association was Morton F. Judd, general manager, Raybestos Division, Raybestos-Manhattan, Inc., Bridgeport, Conn., who was elected to the executive committee.

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Production of rubber thread and elastic web is reported to have shown improvement at plants of the United Elastic Corp., Easthampton, Mass., comprising the Glendale Elastic Fabric Company, George S. Colton Elastic Web Company and the Easthampton Rubber Thread Company. Operations have climbed back to a point approximating 50 per cent of normal, it is understood.

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Frederick Schavoir, vice-president and general manager of the Schavoir Rubber Company, Stamford, Conn., and Mrs. Beatrice Wickes of New York City, were married October 26 in New York.

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Acme Wire Company, Hamden, Conn., is building a varnish house at its plant, 1255 Dixwell avenue. The building will be 20 x 20 feet, one story high, of brick construction and will cost about $2,500. Directors of the Acme company recently voted a dividend of 50 cents a share, payable November 15 to stockholders of record October 31. This is double the amount paid recently to stockholders, which has been 25 cents.

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The Fisk Rubber Union, organization of employes at the Fisk Rubber Corp. plants in Chicopee Falls, Mass., has become affiliated with the United Rubber Workers of America and thus indirectly with the American Federation of Labor. An official charter from the U. R. W. A. has been obtained by the Fisk group.

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Alleging that an option for which he had paid $5,000 had been disregarded in the recent sale of the former H. E. Verran Company factory in Stamford to the American Cyanamid Company, Harry Schwartz, of New York City, has brought suit for $100,000 damages against Barrymore Seamless Wiltons, Inc., and the Cyanamid Company, respectively vendor and purchaser in the recent transaction.

The plaintiff claims that on September 7, 1935, he gave a check for $5,000 to the Barrymore Company as a binder for the sale of the property to him. He asks that the court order Cyanamid to reconvey the property to Barrymore, and that the latter company then be ordered to carry out the alleged contract with him.

## GOODYEAR ESTIMATES PRODUCTION CAPACITY

Subsequent to a statement by President Paul Litchfield, of Goodyear, last month pertaining to the current situation in the tire manufacturing and distributing industries (which was reported in the previous issue) an issue of the *Wingfoot Clan*, Goodyear house organ, carried statistics bearing out Mr. Litchfield's contentions. Despite the marked mortality of tire manufacturers in the last decade or so, the total capacity of the thirty-one companies currently engaged in tire production is approximated at 68,000,000 tires annually.

According to the *Clan*, the market in 1936 will absorb some 48,300,000 tires, or, in other words, there is an excess capacity in the tire industry today of about 20,000,000 tires, or 40%. The following table depicts the thirty-one tire manufacturers in existence today, the figures quoted being the estimated daily tire production capacity of each company:

| | |
|---|---|
| Armstrong Rubber Co. | 400 |
| Coast Tire & Rubber Co. | 300 |
| Corduroy Tire & Rubber Co. | 1,500 |
| Dayton Rubber Mfg. Co. | 3,800 |
| Denman Tire & Rubber Co. | 2,000 |
| Dunlop Rubber Co. | 3,500 |
| Firestone Tire & Rubber Co. | 45,000 |
| Fisk Rubber Company | 15,000 |
| Gates Tire & Rubber Co. | 4,000 |
| General Tire & Rubber Co. | 7,800 |
| Goodrich, B. F. Company | 35,000 |
| Goodyear Tire & Rubber Co. | 75,000 |
| Hamilton Rubber Mfg. Co. | 500 |
| India Tire & Rubber Co. | 2,200 |
| Inland Tire & Rubber Co. | 3,500 |
| Kelly-Springfield Tire Co. | 10,000 |
| Lee Tire & Rubber Co. | 4,000 |
| Mansfield Tire & Rubber Co. | 3,000 |
| Master Tire & Rubber Co. | 3,200 |
| McCreary Tire & Rubber Co. | 300 |
| Mohawk Rubber Co. | 2,500 |
| Monarch Tire & Rubber Co. | 800 |
| Murray Tire & Rubber Co. | 3,500 |
| Norwalk Tire & Rubber Co. | 800 |
| Overman Cushion Tire Co. | 300 |
| Pennsylvania Rubber Co. | 3,500 |
| Pharis Tire & Rubber Co. | 7,000 |
| Schenuit Rubber Co. | 300 |
| Seiberling Rubber Corp. | 5,000 |
| R. C. A. Rubber Co. | 200 |
| U. S. Rubber Co. | 38,000 |
| Estimated Yearly Capacity (250 days) | 68,000,000 |

The tire market for each year since 1928, divided into the three principal markets, i.e., renewal, original equipment, and export, is shown in the following table, together with an estimate for 1936's market:

*(In Thousands)*

| Year | Total | Renewal | Orig. Equip. | Export |
|---|---|---|---|---|
| 1928 | 69,882 | 49,498 | 17,689 | 2,695 |
| 1929 | 69,583 | 45,677 | 20,956 | 2,950 |
| 1930 | 54,299 | 37,972 | 13,628 | 2,699 |
| 1931 | 48,870 | 37,313 | 9,600 | 1,957 |
| 1932 | 39,817 | 32,725 | 6,000 | 1,092 |
| 1933 | 43,932 | 32,496 | 10,200 | 1,236 |
| 1934 | 45,930 | 31,830 | 12,600 | 1,500 |
| 1935 | 47,500 | 29,500 | 16,500 | 1,500 |
| *1936 | 48,300 | 29,000 | 18,000 | 1,300 |

* Estimated.

## Goodrich Host to Research Group

The pertinent value of rubber research to industry was extolled by President J. D. Tew, of Goodrich, to a group of fifty-six prominent business and banking executives of the National Research Council, on October 23, on the occasion of the group's visit to the Goodrich Akron factories. Circumstances leading to the discovery of Koroseal, the Goodrich synthetic-like rubber, by Dr. W. L. Semon, were explained by Dr. Trumbull. Harry Waner, of the Physical Laboratory, told how research overcame the menace of ice in air transport with the introduction of de-icers for wings and propellers. Other Goodrich chemists and executives addressed the research group which was later tendered a luncheon at the Portage Country Club.

# LOS ANGELES NEWS

The first tanker of latex ever to be unloaded in Los Angeles harbor for local use was received by the United States Rubber Company, Samson Division, recently. Previously the latex had all been received in drums. The shipment, 65,425 gallons, was the first of repeated shipments to be received in the future, one tanker every two months.

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The first monthly meeting of the year of the California Rubber Manufacturers' Association, scheduled for early October at the Jonathan Club, was postponed for one month due to the absence of members from the city. C. N. Merralls, president, hopes for a full attendance at the November meeting.

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Twenty-five hundred people attended the annual fall picnic of the employes of the United States Rubber Company, Samson Division, at Irvine Park in Orange County. Prizes were awarded in a variety of athletic contests and the event closed with a big dance.

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The Los Angeles Chamber of Commerce in a representative publicity article sums up briefly the growth of the tire manufacturing industry in this city. It is pointed out that at the present time one tire out of each eleven tires manufactured in the United States are manufactured in the Los Angeles section. This growth has occurred since 1917. Briefly recorded, the first tire factory was established at Compton, Los Angeles suburb, in 1917, by A. Schleicher of the Samson Tire and Rubber Corporation. In 1919 the Goodyear Tire and Rubber Company of California was established on Central avenue, Los Angeles, and included in its factory a fabrics plant using southwestern long staple cotton.

In 1927 James B. Tew, now president of The B. F. Goodrich Rubber Company, came to Los Angeles and built on a 40 acre tract in East Los Angeles one of the most modern and ornate one-floor factories for straight-line production in America. In 1928 Harvey S. Firestone, Sr., built one of his largest plants in South Los Angeles. In 1929 the Samson Tire and Rubber Corporation built its fine Assyrian type building in East Los Angeles and linked up with the U. S. Rubber Company, the Los Angeles plant becoming known as the Samson Division of the U. S. Rubber Company.

The industry is now the fifth largest industry in Los Angeles County, and that is saying something inasmuch as the county ranks first in America in the value of agricultural products and stands practically at the top in oil production.

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Average receipts of crude rubber at the Los Angeles harbor are now averaging 40,000 net tons per year. Exports out of the harbor in tires and tubes total 13,000 tons, 80% of which are exports to offshore markets. Tires made on the West coast are shipped as far east as the midcountry states.

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W. R. Hucks, chemist for the B. F. Goodrich Rubber Company, is scheduled to spend most of November and December in research work in the home plant at Akron, Ohio.

# Names in the News

LAWRENCE C. LOVEJOY, assistant personnel director of the Firestone Tire & Rubber Company, Akron, has left that company to join the Wilson Employment Service, Inc., of Cleveland. He was with Firestone for 15 years.

W. EDWIN PALMER, secretary and assistant treasurer, Seiberling Rubber Company, Akron, was appointed to the office of Grand Recorder of the Grand Commandery, Knights Templar, of Ohio, last month. He is prominent as a 33rd degree Mason.

HERBERT E. SMITH, vice-president, U. S. Rubber Company, and general manager of the Mechanical Goods Division as well as the General Products Division, was elected to the chairmanship of the Sales Committee last month. He is also a member of the board of directors and the executive committee.

WILLIAM O'NEIL, president, General Tire & Rubber Company, Akron, was the only rubber executive included in a list of 11 outstanding industrial leaders selected by Eugene Whitmore, business writer, in an article on "Men Who Made the Grade" in a recent issue of *American Business & System.*

M. L. TAYLOR, aeronautic sales engineer, B. F. Goodrich Company, Akron, discussed the work accomplished by Goodrich in combatting ice on aircraft before the annual meeting of the American Society of Mechanical Engineers, in St. Louis, on October 10.

CLARENCE W. LINDSEY, formerly associated with the New York office of Marshall Field & Company, has joined Wellington Sears Company, Inc., also of New York, where he will be active in the development of fine synthetic yarn fabrics.

H. E. SIMMONS, president of Akron University, discussed the "Development of the Rubber Industry" at the first management dinner of the B. F. Goodrich Company held last month in Akron. Some 250 were in attendance.

DR. EDWARD R. WEIDLIN, director, Mellon Institute of Industrial Research, of Pittsburgh, was presented with the Chemical Industry Medal for 1935, at a meeting of the American Section of the Society for Chemical Industry, held at the Chemists' Club in New York City, early this month.

H. G. SCHMIDT, Goodyear engineer, addressed a meeting of the Summit County Association of Professional Engineers, held on October 17 in the Goodyear Cafeteria.

HENRY WELCH, a director in several American and English rubber companies, predicted that the American demand for rubber in 1935 will exceed the 1929 total, last month. He also stated that world stocks should be reduced by some 97,000 tons by the end of the year.

V. R. JACOBS, manager, aviation sales, Goodyear Tire & Rubber Company, Akron, spoke before the Lions Club of Akron on October 29 at a meeting held at the Y. M. C. A. on the subject of "Stratosphere Expeditions."

B. W. HENDERSON, sales manager, Crude Rubber Department, American Cyanamid & Chemical Corporation, New York City, has also been placed in charge of the sales of rubber chemicals. The department will henceforth be known as the Rubber and Rubber Chemicals Department.

V. N. MORRIS, associated with the Firestone research division for the past eight years, is now engaged in a research capacity for the Resinous Products & Chemical Company of Philadelphia.

W. E. WILSON, former president of the Akron Rubber Mold Company, Akron, was seriously injured on October 24 in an automobile accident that cost his wife's life. He was in a Cincinnati hospital at last reports.

N. C. GRESHAM has been engaged by the Ohio Rubber Company, Willoughby, Ohio, to study time and motion activities in the factory, a newly-created post. He is a graduate of Akron University.

C. L. REELY has resigned his position as director of merchandising of the Mansfield Tire & Rubber Company, Mansfield, Ohio, and has joined Fuller, Smith & Ross, advertising agency of Cleveland, as an account executive.

E. G. REED, chairman of the Goodyear efficiency department, at Akron, addressed the Central Ohio section of the American Society of Mechanical Engineers on October 18 in the Battelle Memorial Institute in Akron. His subject was "Wage Designs."

ROY WETZEL, director of advertising for the Dayton Rubber Manufacturing Company, Dayton, Ohio, addressed the Annual Advertising Convention in Kansas City on October 16 in conjunction with the honor award given the company for its 1935 advertising campaign on Dayco printing rollers.

V. M. KAYE, manager of Euzkadi, the B. F. Goodrich Mexican affiliate, in company with ANGEL URRAZA, president of the Mexico City manufacturing company, conferred with home office officials in Akron last month.

W. A. GIBBONS, director, General Laboratories, U. S. Rubber Products, Inc., Passaic, N. J., is expected to return from Europe shortly where he has been spending some time at the company's English headquarters.

R. E. RICHARDS, general manager, Swann Products Division, Monsanto Chemical Company, has been transferred from the New York to the St. Louis office.

GEORGE B. PEASE, of the Goodyear production department, Akron, sailed early this month for Buitenzorg, Java, where he will be stationed at the new Goodyear factory for the next several months.

WALTER RITZ has been appointed New England representative for the United Carbon Company, according to W. W. HIGGINS, eastern district sales manager. Mr. RITZ was with DuPont for twelve years prior to his joining United Carbon.

## Charles J. Davol Feted

Charles J. Davol, president of the Davol Rubber Company, Providence, Rhode Island, was presented with a bronze statuette of an Indian astride his horse, sculptored by C. V. Dallin, and symbolizing the industrial peace of the Davol company under his direction, last month on the occasion of his fiftieth year of service with the concern. During the past 25 years he has held the position of president. Mr. Davol entered the employ of the company in 1885. After serving an apprenticeship term of several years duration he was named general manager in 1909. During that year he was elevated to the presidency on the death of Joseph Davol, also being named treasurer. Later he was also given the post of managing director which he relinquished to Ernest I. Kilcup in July of 1933. In addition to the statuette Mr. Davol received other gifts from employes and friends as well as dozens of congratulatory messages.

## Rubber-Gel Retains Noble

Dr. Royce J. Noble, author of "Latex in Industry," has been retained by the Rubber-Gel Products Corporation, of North Quincy, Massachusetts, as consulant on technical development of the Kaysam process for the manufacture of rubber articles directly from latex by molding. The Rubber-Gel concern is a subsidiary of the Kaysam Corporation of America, which owns the United States and Canadian patents covering the Kaysam process. It leases space in the plant of the Alfred Hale Rubber Company, in North Quincy, and also operates a New York City office at 1 East 57th Street.

## Firestone to Move Plants?

A persistent rumor in Akron states that because of a heavy increase in the volume of business being done by the mechanical rubber goods division of the Firestone Tire & Rubber Company that division may be shifted to Detroit. Another rumor insists that the steel products plant will be shifted to that city. Although Firestone officials have emphatically denied the rumors they are given strength by the fact that all sundry rubber parts made for the Ford Motor Company are produced by Firestone.

ERNEST I. KILCUP, executive manager, Davol Rubber Company, Providence, R. I., was the principal speaker at a recent meeting of the Providence Chapter of the National Association of Cost Accountants, held at the Metacomet Golf Club.

WILLIAM S. RICHARDSON, merchandise manager, mechanical goods division, of the B. F. Goodrich Company, Akron, was scheduled to address the second Goodrich management dinner and forum at Polsky's in Akron on November 7.

R. DAVISON, manager, market development division, New Jersey Zinc Sales Company, New York City, was recently elected president of the National Industrial Advertisers Association. He had been a vice-president for two years prior to his elevation to the presidency.

J. J. NEWMAN, vice-president, and J. L. MACKNIGHT, assistant secretary, of the B. F. Goodrich Company, Akron, were in New Zealand last month inspecting sites for the possible erection of a tire factory.

# Obituaries

### *Otto Meyer*

Otto Meyer, president of the Meyer & Brown Corporation, crude rubber importers of New York City, died on November 5, at the Lawrence Hospital, Bronxville, N. Y., at the age of 60, after a brief illness. A resident of Scarsdale, N. Y., Mr. Meyer was born in Hamburg, Germany, in 1874, and was graduated from the local high school in 1890. In the same year he entered the employ of a rubber importing firm in Hamburg and came to the United States in 1896 as a clerk for the Liverpool (England) firm of Segal & Company, which had opened a Boston office. In 1903 he came to New York as a partner in A. T. Morse & Company, one of America's pioneer crude rubber dealers. In 1912 Mr. Meyer and A. H. Brown took over the Morse concern and formed the partnership of Meyer & Brown. In December, 1926, Mr. Brown retired and Mr. Meyer reorganized the company under its present corporate name and set-up. He was president of the reorganized firm up to the time of his death. Mr. Meyer was noted for his music patronage. He was a member of the Fairview Country Club. A widow, three sons and two daughters survive.

### *Henry W. Young*

Henry W. Young, assistant to Hugh A. Galt, president of the Columbia Alkali Corporation, died at his home in Barberton, Ohio, at the age of 53, on October 21, following an illness of two months. His health began to decline two years ago after a siege of pneumonia recently suffering a stroke and complications. Mr. Young came to Barberton in 1901 with the Pennsylvania Railroad. In 1917 he joined the Columbia Alkali Corporation as traffic manager and was later elevated to assistant to the president. He was prominent in the social and business life of Barberton serving as president of the Chamber of Commerce at one time. He also served a term as president of the Brookside Country Club. His Masonic affiliations included membership in several lodges, being secretary of the Barberton Masonic Temple Company. Funeral services were held at the Campbell-Hickman funeral chapel on October 23 with interment in Greenlawn Memorial Park. He is survived by his widow and two sisters.

### *William C. Nester*

William C. Nester, employment manager of the New Jersey Zinc Company, died at the age of 50 at the Post-Graduate Hospital in New York City on October 22. Making his residence in Franklin, New Jersey, Mr. Nester was secretary of the Sussex County Democratic Committee and served for a number of years on the Franklin Borough Council. At one time he also served a period as chief of police. He is survived by a widow, six sons and three daughters.

### *Samuel Russell*

Samuel Russell, 62, former first vice-president of the Russell Mfg. Co., Middletown, Conn., and third of his name in descent from the original Samuel Russell who founded the company, died of pneumonia October 4, in Camden, S. C. Although the third Samuel, he was the fourth generation from the beginning of the Russell company. A brother, Thomas Macdonough Russell, who was much more active than himself in the affairs of the manufacturing concern, died a few weeks ago. Samuel Russell is survived by his widow, a sister and a step-sister.

### *Frank H. Turner*

Frank H. Turner, at one time associated with the Hartford Rubber Works, Hartford, Connecticut (later absorbed by U. S. Rubber), in the capacity of superintendent, died at his home in West Hartford on September 23. Born in 1857 at Peru, New York, Mr. Turner joined the Hartford works in 1894 as superintendent after spending twelve years with various rubber companies. He was with Hartford for a number of years serving as vice-president at one period and treasurer at another. He is credited with the invention of the solid rubber tire for trucks. After leaving the Hartford works he was engaged in the elevator business at Springfield, Mass., and later joined the Underwood Typewriter Company serving with that concern until the time of his death. Mr. Turner is survived by his widow, a son, a daughter, three brothers and two sisters.

### *William A. North*

William Armstrong North, widely known in the rubber footwear field over a score of years and formerly merchandise manager of the Footwear Division, U. S. Rubber Company, died at his home in Maplewood, New Jersey, on October 30, after an extended illness. He was 56 years of age. Mr. North joined U. S. Rubber in 1901 as a salesman in the Footwear Division. In later years he became branch manager for the company in several large cities including Utica, Pittsburgh and Boston. From 1922 to 1924 he acted as general manager for footwear sales. From 1924 until his retirement because of poor health in 1932 he was merchandise manager of the same division. He leaves a widow, mother, brother, three daughters and a son. The son, James, is with the export department of U. S. Rubber.

### *John T. Spicer*

John T. Spicer, one-time sales manager for the Thermoid Rubber Company, of Trenton, N. J., and more recently sales manager for the Johns-Manville Corporation, of New York City, died on October 31 from a heart attack suffered in a garage adjoining his residence in Trenton. He was 47 years of age. Mr. Spicer resigned as sales manager for Thermoid in 1924 and for a time thereafter was employed by a Philadelphia advertising firm, later joining Johns-Manville from which he severed connections two months ago. He was a graduate of Exeter Academy, New Hampshire, and also of the State Model School in Trenton. He leaves a widow, mother and two children. Burial was in Riverview Cemetery, Trenton.

### *George M. Ellsworth*

George M. Ellsworth, 61, who retired last year as employment manager of Jenkins Bros. Co., Bridgeport, Conn., after nearly 40 years with the company, died October 25 after a long illness. He joined Jenkins Bros. on May 1, 1895. Surviving are his wife, two sons and three daughters.

## Mohawk Reports Sales Increase

J. L. Earl, vice-president and general manager of the Mohawk Rubber Company, Akron, reports improved business conditions with sales for the months of September and October "the most satisfactory this year." Unit sales of Mohawk tires for September showed an increase of 56½ per cent compared with the same month of 1933, while dollar volume showed an increase of 60.4 per cent. Sales for October, 1935, are said to be somewhat comparable to these figures. According to Mr. Earl "elimination of branch operations has resulted in substantial savings."

# TRENTON NEWS

The Citron-Byer Company, of Trenton, N. J., purchased the plant of the New Jersey Rubber Company, Lambertville, at an auction sale on October 10. The price bid was $3,800. The purchase consisted of seventeen buildings and a portion of Lewis Island for $600. Water power is developed on the island for the factory. Another building, which is 80 years old, was purchased by the Panther Rubber Company, of Chelsea, Mass., for $4,600. Equipment, including boilers, motors, 3,000 feet of rubber belting and 20,000 pounds of rubber, was sold to New York and Boston interests. The New Jersey Rubber Company was operated from 1890 until five years ago in the reclaiming of rubber for DuPont, John A. Roebling's Sons, and other concerns. For several years the plant was operated on a 24 hour a day schedule and employed 125 men. The Clapp interests of Boston purchased the concern in 1909 from the late Edward R. Solliday, one of the organizers.

The American Hard Rubber Company, Butler, N. J., and the Rubber Workers Union have renewed a working agreement for six months. The union was seeking a 10 per cent increase in wages and this was turned down after the employes had been informed that the wage level was the same as paid elsewhere. A raise of 5 cents an hour for women employes was also rejected. It was agreed that employes being discharged or quitting voluntarily would lose their seniority.

Business is on the uplift at several of the Trenton, N. J., rubber manufacturing plants. The Puritan, Joseph Stokes and Thermoid companies are now operating twenty-four hours a day while the Pierce-Roberts Rubber Company is running two shifts.

Fabest Rubber Mat Company, Inc., of 29 Greene Street, Hackensack, N. J., has been incorporated at Trenton with a capital stock of $125,000, to manufacture rubber products and novelties of all kinds. The incorporators are Paul Faber, of 275 Beech Street; Jack Faber, of 267 Beech Street; and Adelaine Sylvester, of 29 Greene Street, all of Hackensack. The office of the company is at 29 Greene Street, Hackensack.

# New Rubber Goods

## Rubberized Gloves

Two manufacturers, both located in Philadelphia, have recently brought out special types of rubberized gloves adopted to specific uses. The Quaker Wares Division of the Philadelphia Rust-Proof Company, 3229 Frankford Avenue, has introduced rubber-covered utility gloves which are made of Canton Flannel chemically treated to insure proper penetration of the rubber into the weave of the fabric. Vulcanized latex is used in the impregnating process. After the gloves are coated they are heat treated and finished. These gloves are recommended for use by coal miners, in chemical plants and refineries, for handling glass, lumber and stone, and a variety of other purposes, with the manufacturer suggesting that any oil or grease be wiped off the gloves after use because of the deteriorating effect of these petroleum products on rubber. M. L. Snyder & Son, at Third Street, above Arch, is featuring the Arco Rubberized Cotton Gloves which are claimed to be water-, slip-, acid-, and splinter-proof. They are made in all lengths, styles, weights and sizes. Reinforcement can be had on palms, fingers and thumbs when requested. Because of the roughened surface these gloves are especially adaptable for the fishing industry, since they are useful in holding on to squirming fish or other wet and slimy articles. Arco Rubberized Gloves are made with a double knit wrist. They are available in white and black.

Philadelphia's Utility Gloves

Snyder's Rubberized Gloves

## Sturgis Rubberized Chair

A new model stenographic chair, completely equipped with rubberized hair pads allowing extreme comfort in posture chairs, is being featured by the Sturgis Posture Chair Company, of Sturgis, Michigan. The roomy seat (14½x16½ inches) and form-fitting back (6x14 inches) are upholstered in leather over rubberized curled hair pads. The seat pad is 3½ inches thick, while the back pad is 1½ inches thick. Seat height is adjustable without tools. A base of 1¼ inch tubing is provided to give a balanced appearance. The new model chair is also equipped with hard rubber casters. A variety of colors is obtainable.

## New Rubber "Meow" Ball

Katnips, Incorporated, 26 Custom House Street, Providence, Rhode Island, has added the rubber "Meow" ball to its line of novelties for children and pets. Unlike ordinary balls, the bouncing "Meow" model can have its walls completely squeezed together without damage, meowing lustily while resuming its natural shape. It is suitable and safe for babies and children since it is made from solid colored compounds without any paint whatever to crack or flake off. It is equipped with a real, vibrating reed whistle that is rust-proof and which will not come out. Katnips, Inc., are manufacturers of the rubber "Katnips" which also "meow" when squeezed. These novelties, one of which is reproduced herewith, are washable and rust-proof, have ears, bright eyes, and although they rock freely always settle back in an upright position. "Katnips" are sold in two sizes, while only one size of the new "Meow" ball is available at present.

## Goodrich "Off-Pavement" Tire

A new passenger car tire especially designed for off-pavement service in mud and snow has been announced by the B. F. Goodrich Company, Akron. It has been designated the Goodrich Super-Traction Silvertown. It is expected to prove valuable to farmers, ranchers, oil field operators, etc. It is constructed with the Life-Saver Golden Ply to resist heat. The tread is deep and open with thick, sharp-edged cleats with wide spaces between cleats to prevent clogging of mud and snow. The extra-thick tread extends the entire width of the tire for maximum road contact.

## United States Rubber Introduces All Purpose "Leggin" Boot

A rubber boot which folds into a compact bundle when not in use, and which fits over all types of leather shoes, has been introduced by the Footwear Division of United States Rubber Products, Inc., under the name of the "Leggin Boot." It is easily carried, and is slipped on and off in a jiffy. The novel boot has a "heavy patrol" bottom while the top is of a high-grade compound. It has a two-ply lining for flexibility. A strap at the top of the boot slips over the top and acts as a holder for the rolled-up boot. It is best described as a slush boot with a red knurled sole for ground-grip and safety. Motorists can carry it in the pockets of their cars. It can be used by motorcycle riders, policemen, railroad workers, postmen, and for general work, etc.

# MARKETS

## RUBBER—COTTON AND FABRICS—CHEMICALS

**NEW YORK, NOVEMBER 9, 1935**

## Crude Rubber

A SERIES of favorable developments has resulted in a steady rise in crude rubber prices since our last report. Quotations for spot and futures, currently quoted, are one full cent higher than prices in the preceding month. The developments included a continued week-to-week reduction of stocks in London and Singapore, still another increase in the Dutch export tax on native shipments, reports from automotive quarters indicating an optimistic outlook for 1936, and the increase of business conditions generally. High for the month for spot on the Exchange was 13.50 on October 30; low was 12.31 on October 10. Publication of net exports from countries participating in the restriction scheme, which showed September shipments below the permissible amount, resulted in a 25 point jump for spot from 13.25 to 13.50 on October 30. Quotations in the outside market, Exchange, London and Singapore, follow:

As of November 9

| | | | |
|---|---|---|---|
| ***Plantations—*** | | | |
| Ribbed Smoked Sheets— | | | |
| No. 1, Spot | — | @ | .13¼ |
| April-June | — | @ | .13¾ |
| No. 2 | — | @ | .12⅞ |
| No. 3 | — | @ | .12½ |
| No. 4 | — | @ | .12¾ |
| Thin Latex Crepe | — | @ | .13½ |
| Thick Latex Crepe | — | @ | .13⅜ |
| Brown Crepe, No. 1 | — | @ | .13 |
| Brown Crepe, No. 2 | — | @ | .12⅞ |
| Amber Crepe, No. 2 | — | @ | .13 |
| Amber Crepe, No. 3 | — | @ | .12⅞ |
| Amber Crepe, No. 4 | — | @ | .12½ |
| Brown Crepe, Rolled | — | @ | .12⅝ |
| ***Latex—*** | | | |
| Liquid Latex, per gal. | .51 | @ | .52 |
| ***Paras—*** | | | |
| Up-River, fine | — | @ | .13 |
| Acre Bolivian, fine | — | @ | .13¼ |
| ***Balata—*** | | | |
| Block, Ciudad | — | @ | .32 |

### LONDON MARKET

Standard Smoked Sheets—Buyers—November 9

| | | | |
|---|---|---|---|
| November | — | @ | 6 3/16d |
| Jan.-March | — | @ | 6 1/16d |

### SINGAPORE MARKET

Standard Smoked Sheets—Sellers—November 9

| | | | |
|---|---|---|---|
| November | — | @ | 6¼d |
| Jan.-March | — | @ | 6⅛d |

## Reclaimed Rubber

Demands from all branches of the rubber industry for reclaims continues to increase. This increase is attributed in large part to the steady improvement of general business conditions, especially in the automotive and industrial fields. Current levels are still attractive for future deliveries. There has been no change in quotations since our last report.

| | | | | |
|---|---|---|---|---|
| ***High Tensile*** | | | | |
| Super-reclaim, black | lb. | .08¼ | @ | .09 |
| High Tensile Red | lb. | .07 | @ | .07¼ |
| ***Shoe*** | | | | |
| Unwashed | lb. | .06½ | @ | .06¾ |
| Washed | lb. | .08 | @ | .09 |
| ***Tube*** | | | | |
| No. 1 (Floating) | lb. | .13 | @ | — |
| No. 2 (Compounded) | lb. | .07½ | @ | .07¾ |
| ***Tires*** | | | | |
| Black | lb. | .05 | @ | .05¼ |
| Black, selected tires | lb. | .05¼ | @ | .05½ |
| Dark Gray | lb. | .06¼ | @ | .06½ |
| White | lb. | .09¼ | @ | .09½ |
| Truck, Heavy Gravity | lb. | .05½ | @ | .06 |
| Truck, Light Gravity | lb. | .06 | @ | .06¼ |
| ***Miscellaneous*** | | | | |
| Mechanical blends | lb. | .04¼ | @ | .04½ |

## Scrap Rubber

Consumers of scrap continue active with a noted improvement in demand. Tire supplies are ample but tube stocks are becoming limited as the winter advances, slightly higher prices already being quoted. Current quotations follow:

(Prices to Consumers)

| | | | |
|---|---|---|---|
| Auto tire peelings | ton | 15.00 | @17.50 |
| Mixed auto | ton | 7.00 | @ 8.00 |
| Clean solid truck tires | ton | 34.00 | @35.00 |
| Boots and shoes | ton | 18.00 | @20.00 |
| Arctics, untrimmed | ton | 14.00 | @16.00 |
| Inner tubes, No. 1 | lb. | .07⅜ | @ .08 |
| Inner tubes, No. 2 | lb. | .03¼ | @ .03⅜ |
| Inner tubes, Red | lb. | .03⅛ | @ .03¼ |

## Cotton

Due to marked activity in the southern spot markets and increased demands from both foreign and domestic spinners, combined with continued improvement of general business conditions, cotton prices continued to move upward last month culminating in an 11.80 quotation on November 9. A slight recession from the upward movement occurred in mid-October due to speculative long liquidation but the steady basis in the south resulted in an immediate improvement in the price. Low for the month was 11.15 quoted on the Exchange on October 17. World consumption of cotton continues to rise and a noted improvement is seen in the cotton mill situation which should indicate still higher prices soon. The futures market, however, holds within a narrow range mostly because Government agencies are long and short a large amount of cotton. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

| | October 9 | November 9 | | |
|---|---|---|---|---|
| | Close | High | Low | Close |
| December | 10.96 | 11.41 | 11.34 | 11.39 |
| March | 11.03 | 11.27 | 11.20 | 11.25 |
| May | .... | 11.27 | 11.20 | 11.25 |

## Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

| | | | | |
|---|---|---|---|---|
| Peeler, carded, 23/5/3 | lb. | .33¾ | @ | .34 |
| Peeler, carded, 23/4/3 | lb. | .34¾ | @ | .35 |
| Peeler, carded, 15/3/3 | lb. | .31¾ | @ | .32 |
| Peeler, carded, 13/3/3 | lb. | .30¾ | @ | .31 |
| Egyptian, carded, 23/5/3 | lb. | .46¼ | @ | .46¾ |
| Egyptian, combed, 23/5/3 | lb. | .51¼ | @ | .51¾ |
| CHAFERS | | | | |
| Carded, American, 1 1/16" | lb. | .33½ | @ | .34½ |
| Carded, American, 1" | lb. | .30½ | @ | .33 |
| LENO BREAKER | | | | |
| Carded, American, 1" | lb. | .31½ | @ | .32½ |

## Sheetings

| Count | Width | Weight | | | |
|---|---|---|---|---|---|
| 48x40 | 36 in. | 5.50 | lb. | — | @ .05⅞ |
| 40x40 | 36 in. | 6.15 | lb. | — | @ .05¼ |
| 40x36 | 36 in. | 6.50 | lb. | — | @ .05 |
| 48x48 | 40 in. | 2.50 | lb. | — | @ .11 |
| 48x48 | 40 in. | 2.85 | lb. | — | @ .09⅞ |
| 56x40 | 40 in. | 3.60 | lb. | — | @ .09 |
| 48x44 | 40 in. | 3.75 | lb. | — | @ .08 |
| 44x40 | 40 in. | 4.25 | lb. | — | @ .07⅛ |

## Ducks

| | | | | |
|---|---|---|---|---|
| Enameling | lb. | .32 | @ | .36 |
| Belting and Hose | lb. | .32 | @ | — |
| Single filling, A grade | lb. | .16½ | @ | — |
| Double filling | lb. | .17½ | @ | — |

## *Closing Rubber Prices on New York Commodity Exchange, Inc.*

*No. 1 Standard Contract of 10 tons*

FROM OCTOBER 10 TO NOVEMBER 9

| Date | | Spot | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Sales |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oct. | 10 | 12.31 | 12.31 | 12.39 | 12.48 | 12.56 | 12.63 | 12.70 | 12.77 | 12.84 | 12.91 | 12.98 | 13.04 | 13.11 | | 106 |
| | 11 | 12.59 | 12.57 | 12.65 | 12.74 | 12.82 | 12.89 | 12.96 | 13.03 | 13.11 | 13.18 | 13.26 | 13.32 | 13.39 | | 410 |
| | 12 | | | | | | | | | | | | | | | |
| | 13 | | | | | | | | | | | | | | | |
| | 14 | 12.50 | 12.49 | 12.57 | 12.66 | 12.74 | 12.80 | 12.87 | 12.94 | 13.02 | 13.09 | 13.17 | 13.23 | 13.30 | | 204 |
| | 15 | 12.65 | 12.65 | 12.73 | 12.82 | 12.90 | 12.97 | 13.04 | 13.11 | 13.18 | 13.24 | 13.31 | 13.38 | 13.45 | | 257 |
| | 16 | 12.72 | 12.70 | 12.77 | 12.84 | 12.92 | 13.00 | 13.08 | 13.14 | 13.21 | 13.29 | 13.37 | 13.44 | 13.52 | | 312 |
| | 17 | 12.75 | 12.77 | 12.84 | 12.91 | 12.99 | 13.06 | 13.13 | 13.19 | 13.26 | 13.32 | 13.39 | 13.45 | 13.52 | | 211 |
| | 18 | 13.00 | 12.97 | 13.04 | 13.11 | 13.20 | 13.27 | 13.35 | 13.42 | 13.50 | 13.57 | 13.64 | 13.70 | 13.77 | | 348 |
| | 19 | 12.93 | 12.93 | 13.00 | 13.07 | 13.13 | 13.22 | 13.32 | 13.37 | 13.44 | 13.51 | 13.58 | 13.64 | 13.71 | | 253 |
| | 20 | | | | | | | | | | | | | | | |
| | 21 | 13.00 | 12.93 | 13.00 | 13.07 | 13.14 | 13.22 | 13.31 | 13.38 | 13.45 | 13.51 | 13.57 | 13.63 | 13.70 | | 214 |
| | 22 | 12.85 | 12.78 | 12.85 | 12.92 | 13.00 | 13.08 | 13.17 | 13.24 | 13.32 | 13.38 | 13.45 | 13.51 | 13.58 | | 235 |
| | 23 | 13.06 | 13.09 | 13.13 | 13.16 | 13.22 | 13.30 | 13.39 | 13.45 | 13.52 | 13.59 | 13.67 | 13.75 | 13.84 | | 442 |
| | 24 | 13.06 | 13.02 | 13.09 | 13.16 | 13.24 | 13.32 | 13.40 | 13.47 | 13.54 | 13.61 | 13.68 | 13.74 | 13.81 | | 361 |
| | 25 | 13.31 | 13.38 | 13.43 | 13.48 | 13.57 | 13.63 | 13.69 | 13.77 | 13.86 | 13.91 | 13.97 | 14.04 | 14.11 | | 531 |
| | 26 | 13.31 | 13.39 | 13.44 | 13.49 | 13.55 | 13.63 | 13.73 | 13.80 | 13.89 | 13.94 | 14.00 | 14.06 | 14.13 | | 154 |
| | 27 | | | | | | | | | | | | | | | |
| | 28 | 13.25 | 13.24 | 13.29 | 13.34 | 13.42 | 13.50 | 13.58 | 13.66 | 13.72 | 13.78 | 13.84 | 13.91 | 13.98 | | 351 |
| | 29 | 13.25 | —— | 13.25 | 13.31 | 13.37 | 13.46 | 13.54 | 13.62 | 13.69 | 13.77 | 13.84 | 13.90 | 13.97 | | 247 |
| | 30 | 13.50 | —— | 13.42 | 13.50 | 13.59 | 13.67 | 13.75 | 13.84 | 13.91 | 13.97 | 14.04 | 14.10 | 14.17 | | 386 |
| | 31 | 13.31 | —— | 13.30 | 13.37 | 13.46 | 13.54 | 13.63 | 13.69 | 13.75 | 13.82 | 13.90 | 13.96 | 14.03 | | 333 |
| Nov. | 1 | 13.25 | —— | 13.26 | 13.32 | 13.40 | 13.47 | 13.54 | 13.62 | 13.69 | 13.76 | 13.83 | 13.89 | 13.96 | 14.02 | 132 |
| | 2 | 13.13 | —— | 13.17 | 13.21 | 13.29 | 13.38 | 13.46 | 13.55 | 13.64 | 13.70 | 13.77 | 13.83 | 13.90 | 13.96 | 57 |
| | 3 | | | | | | | | | | | | | | | |
| | 4 | 13.13 | —— | 13.14 | 13.18 | 13.26 | 13.32 | 13.43 | 13.49 | 13.56 | 13.62 | 13.70 | 13.76 | 13.83 | 13.89 | 176 |
| | 5 | | | | | | | | | | | | | | | |
| | 6 | 13.25 | —— | 13.24 | 13.32 | 13.40 | 13.48 | 13.57 | 13.63 | 13.70 | 13.77 | 13.84 | 13.90 | 13.97 | 14.03 | 109 |
| | 7 | 13.37 | —— | 13.33 | 13.41 | 13.49 | 13.56 | 13.63 | 13.71 | 13.79 | 13.86 | 13.94 | 14.00 | 14.06 | 14.12 | 144 |
| | 8 | 13.25 | —— | 13.26 | 13.34 | 13.41 | 13.49 | 13.57 | 13.65 | 13.73 | 13.80 | 13.87 | 13.93 | 13.99 | 14.06 | 139 |
| | 9 | 13.25 | —— | 13.22 | 13.30 | 13.37 | 13.45 | 13.53 | 13.61 | 13.70 | 13.76 | 13.82 | 13.88 | 13.95 | 14.01 | 73 |

# Rubber CHEMICAL Markets

NEW YORK, NOVEMBER 12, 1935

**[All Quotations F.O.B. Works Unless Otherwise Noted]**

### ACCELERATORS

| | | | |
|---|---|---|---|
| **Organic** | | | |
| A-1 (Thiocarbanilid) | lb. | .21 @ | .25 |
| A-5-10 | lb. | .33 @ | .36 |
| A-7 | lb. | .53 @ | .65 |
| A-11 | lb. | .60 @ | .75 |
| A-16 | lb. | .55 @ | .65 |
| A-19 | lb. | .56 @ | .75 |
| A-32 | lb. | .70 @ | .80 |
| A-17 | lb. | — @ | — |
| Aldehyde ammonia, crystals | lb. | .65 @ | .70 |
| Altax | lb. | — @ | — |
| Captax | lb. | | |
| Crylene | lb. | .55 @ | .65 |
| paste | lb. | .45 @ | .55 |
| Di-Ortho-Tolyguanidine | lb. | .44 @ | .47 |
| Diphenylguanidine | lb. | .35 @ | .37 |
| Ethylidene aniline | lb. | .45 @ | .47½ |
| Formaldenyde aniline | lb. | .37½ @ | .42 |
| Guantal | lb. | .42 @ | .51 |
| Heptene | lb. | .40 @ | — |
| Hexamethylene-tetramine | lb. | .37 @ | — |
| Lead Oleate, No. 999 | lb. | .13 @ | — |
| Witco | lb. | .11 @ | — |
| Lithex | lb. | .18 @ | .20 |
| Methylenedianiline | lb. | .36 @ | .37 |
| Monex | lb. | 3.25 @ | — |
| Oxynone | lb. | .68 @ | .80 |
| Phenex | lb. | .50 @ | .55 |
| Pipsolene | lb. | 3.55 @ | 4.00 |
| R & H 40 | lb. | .40 @ | .41 |
| R & H 50 | lb. | .40 @ | .41 |
| R-2 | lb. | 1.55 @ | 1.90 |
| Safex | lb. | 1.20 @ | 1.25 |
| SPDX | lb. | .75 @ | — |
| Super-Sulphur No. 1 | lb. | | |
| No. 2 | lb. | | |
| Thiocarbanilid, drums | lb. | .21 @ | .25 |
| Trimene | lb. | .75 @ | — |
| base | lb. | 1.20 @ | — |
| Triphenylguanidine | lb. | .58 @ | .60 |
| Tuads | lb. | | |
| Ureka | lb. | .62 @ | 1.00 |
| Ureka B | lb. | — @ | — |
| Ureka C | lb. | .58 @ | .69 |
| Vulcanex | lb. | | |
| Vulcone | lb. | | |
| Vulcanol | lb. | | |
| Z-88-P | lb. | .48 @ | .60 |
| Zimate | lb. | | |
| **Inorganic** | | | |
| Litharge, domestic | lb. | .06½ @ | — |
| Magnesia, calcined, heavy | ton | 60.00 @ | 65.00 |

### COLORS

**Blacks (See Compounding Materials)**

| | | | |
|---|---|---|---|
| **Blues** | | | |
| Prussian | lb. | .37 @ | .39 |
| Ultramarine | lb. | .12 @ | .14 |
| **Browns** | | | |
| Sienna, Italian | lb. | .06 @ | '13 |
| Umber, Turkey | lb | .04 @ | .04½ |
| **Greens** | | | |
| Chrome, light | lb. | .20 @ | .30 |
| medium | lb. | .21 @ | .31 |
| Chromium Oxide, bbl. | lb. | .22 @ | .23 |
| Guignet's Green | lb. | .75 @ | — |
| **Reds** | | | |
| Antimony | | | |
| crimson, 15/17 | lb. | .48 @ | — |
| sulfur, free | lb. | .48 @ | .60 |
| Indian English | lb. | .09 @ | .10 |
| Domestic (Maroon) | lb. | .11 @ | — |
| Red oxide, pure | lb. | .10 @ | .12 |
| Rub-Er-Red, f.o.b Easton | lb. | .09½ @ | — |
| **Whites** | | | |
| Cryptone CB, No. 21 | lb. | .06 @ | .06¼ |
| Cryptone, No. 19 | lb. | .06 @ | .06¼ |
| Cryptone, ZS-20 | lb. | .10½ @ | .10¾ |
| Cryptone, ZS-86 | lb. | .10½ @ | .10¾ |
| Lithopone | | | |
| Albalith, black label—11 | lb. | .04½ @ | .04¾ |
| Azolith | lb. | .04½ @ | .04¾ |
| Rayox | lb. | | |
| Titanium oxide | lb. | .17 @ | .19 |
| Titanox B | lb. | .06 @ | .06½ |
| Titanox C | lb. | .06 @ | .06½ |
| **Zinc Oxide—American Process** | | | |
| American Azo | | | |
| ZZZ (lead free) | lb. | .05 @ | .05¼ |
| ZZ (leaded) | lb. | .04½ @ | .05½ |
| Anaconda, lead free | lb. | .05 @ | .05¼ |
| Horsehead Lead Free Brand | | | |
| Special—3 | lb. | .05 @ | .05¼ |
| XX Red—4 | lb. | .05 @ | .05¼ |
| XX Red—72 | lb. | .05 @ | .05¼ |
| XX Red—78 | | .05 @ | .05¼ |
| XX Red—103 | lb. | .05 @ | .05¼ |
| U. S. P.—X, bbls. | lb. | .08 @ | .08¼ |
| Kadox, black label—15 | lb. | .05 @ | .05¼ |
| Blue label—16 | lb. | .05 @ | .05¼ |
| Red label—17 | lb. | .05 @ | .05¼ |
| St. Joe, black label | lb. | .05 @ | .05¼ |
| green label | lb. | .05 @ | .05¼ |
| red label | lb. | .05 @ | .05¼ |
| **Zinc Oxide—French Process** | | | |
| Florence White seal—7 bbls. | lb. | — @ | .06¼ |
| Green seal—8 | lb. | .06 @ | .06¼ |
| Red seal—9 | lb. | .05½ @ | .05¼ |
| **Yellows** | | | |
| Chrome | lb. | .15 @ | .16 |
| Ocher, dom. med. | lb. | .02¼ @ | — |

### BLACKS

| | | | |
|---|---|---|---|
| Arrow "Aerfloted" Specification | lb. | .0535 @ | .0825 |
| Bone, powdered | lb. | .05½ @ | .12½ |
| Carbon, compressed | lb. | .0535 @ | .0825 |
| uncompressed | lb. | .0535 @ | .0825 |
| "Certified," Cabot | lb. | .0535 @ | .0825 |
| Spherons | lb. | .0535 @ | .0825 |
| "Disperso" | lb. | .0535 @ | .0825 |
| Drop, bbls. | lb. | .05½ @ | .14 |
| "Excello," compressed | lb. | .0535 @ | .0825 |
| "Fumonex" | lb. | .03 @ | .07 |
| "Gastex" | lb. | .03 @ | .07 |
| Lampblack | lb. | .07 @ | .12 |
| "Micronex" | lb. | .0535 @ | .0825 |
| "Supreme" | lb. | .0535 @ | .0825 |
| Thermatomic—"P 33" | lb. | — @ | — |
| "Thermax" | lb. | — @ | — |
| United "Dixie" & "Kosmos" | lb. | .0535 @ | .0825 |

### COMPOUNDING MATERIALS

| | | | |
|---|---|---|---|
| Aluminum Flake | ton. | 21.85 @ | 24.50 |
| Ammonia carbonate, lump | lb. | .10½ @ | .12 |
| Asbestine | ton | 14.00 @ | 15.00 |
| Barium carbonate (98-100%) | ton | 56.50 @ | 61.50 |
| Barium Dust | lb. | .05 @ | .06 |
| Barytes | ton | 22.00 @ | 24.00 |
| Basofor | lb. | .04½ @ | — |
| Bentonite | lb. | .02 @ | .03 |
| Blanc fixe dry f.o.b. works | ton | 70.00 @ | 75.00 |
| Calcene | ton | 35.00 @ | 43.00 |
| Catalpo (fact.) | lb. | .02 @ | — |
| Chalk, precipitated | | | |
| Suprex white, extra lt. | ton | 45.40 @ | 60.00 |
| heavy | ton | 45.00 @ | 55.00 |
| Clay, Kaolin, domestic | ton | 7.50 @ | 15.00 |
| Aerfloted, Suprex | ton | 8.50 @ | 10.00 |
| Congaree | ton | 9.00 @ | — |
| Dixie | ton | | |
| Dixie, Jr. | ton | | |
| McNamee | ton | | |
| Par | ton | | |
| Tensulite | | 15.00 @ | — |
| Witco | ton | 8.50 @ | 9.00 |
| Cotton Flock | lb. | .10½ @ | .18 |
| Glues, extra white | lb. | .28 @ | .30 |
| medium white | lb. | .14 @ | .19 |
| Kalite No. 1 | ton | 30.00 @ | 55.00 |
| Kalite No. 3 | ton | 40.00 @ | 65.00 |
| Magnesium carbonate | lb. | .08 @ | — |
| Mica | ton | 65.00 @ | 80.00 |
| Pyrax A | ton | — @ | — |
| Rottenstone (powdered) | lb. | .02½ @ | .05 |
| Soapstone, powdered | ton | 16.00 @ | 22.00 |
| Starch, powdered | cwt. | 3.56 @ | 3.76 |
| Talc, domestic | ton | 12.00 @ | 15.00 |
| Whiting, commercial | ton | 17.00 @ | 18.00 |
| Columbia Filler | ton | 9.00 @ | 14.00 |
| English Cliffstone | ton | 33.00 @ | 43.00 |
| Sussex | ton | | |
| Witco | ton | 15.00 @ | — |
| Wood Flour | ton | 18.00 @ | 30.00 |
| Zinc Carbonate | lb. | .10½ @ | .11 |
| Zinc Stearate | lb. | .26 @ | — |

### MINERAL RUBBER

| | | | |
|---|---|---|---|
| Black Diamond | ton | 27.00 @ | — |
| Genasco, solid (factory) | ton | 25.00 @ | 27.00 |
| Hard Hydrocarbon | ton | | |
| Parmr, solid | ton | 25.00 @ | 28.00 |
| Pioneer, MR, solid | ton | | |
| Pioneer-granulated | ton | | |

### SPECIALTIES

| | | | |
|---|---|---|---|
| Aromatics—Rodo | lb. | | |
| Para-Dors No. 5145 | lb. | 2.00 @ | — |
| Sunproof | lb. | .35 @ | .37½ |
| Sponge Paste | lb. | — @ | .80 |
| Tonox | lb. | .56 @ | .60 |

### SOFTENERS

| | | | |
|---|---|---|---|
| **Acids** | | | |
| Acetic, 28%, bbls. | 100 lb. | 2.45 @ | 2.70 |
| glacial, USP, bbls. | 100 lb. | 14.00 @ | — |
| Nitric, 36 degrees | cwt. | 5.00 @ | 6.00 |
| Sulfuric, 66 degrees | ton | 15.50 @ | 16.50 |
| **Acids, Fatty** | | | |
| Laurex | lb. | .15 @ | .16 |
| Stearex | lb. | .08½ @ | .13 |
| Stearic, double pressed | lb. | .09 @ | .14 |
| Stearite | lb. | .08 @ | — |
| **Alkalies** | | | |
| Caustic Soda, 76% | cwt. | 3.60 @ | 3.75 |
| Soda Ash, 58% C.L. | cwt. | 2.52 @ | — |

| | | | |
|---|---|---|---|
| **Oils** | | | |
| Corn, refined, bbls. | lb. | .12½ @ | — |
| Cottonseed, crude | gal. | .093 @ | .10 |
| Cycline Oil | gal. | .15 @ | .28 |
| Degras (c.l. 100 bbls.) | lb. | .02¾ @ | — |
| Less c.l. (10-25 bbls.) | lb. | .03 @ | — |
| Lots less than 10 bbls. | lb. | .03¼ @ | — |
| Fluxrite | lb. | .05½ @ | .06½ |
| Palm Lagos | lb. | .05 @ | — |
| Niger | lb. | .04¾ @ | — |
| Para-Flux | gal. | .17 @ | — |
| Petrolatum, light | lb. | .02 @ | .02½ |
| Pigmentaroil, tank cars | gal. | .16 @ | — |
| in drums | gal. | .22 @ | .23½ |
| Pine, steam distilled | gal. | .64 @ | .65 |
| dest. dist., drums | gal. | .40 @ | .45 |
| Rosin Oil, cmpd. | gal. | .40 @ | — |
| Rubtack | lb. | .40 @ | — |
| Seedine, c.l. | lb. | .07¼ @ | — |
| Tackol | lb. | .08½ @ | .18 |
| Witco Palm Oil | lb. | .05 @ | — |
| Witco Softener (f.o.b. wks.) | gal. | .15 @ | — |
| Woburn No. 8, c.l. | lb. | .06 @ | — |
| Wobonite, c.l. | lb. | .05 @ | — |
| **Resins and Pitches** | | | |
| Pitch, Burgundy | lb. | .07 @ | .08 |
| coal tar | gal. | .07½ @ | .08 |
| hardwood | ton | 25.00 @ | 30.00 |
| pine, 200 lb. gr. wt. | bbl. | 6.50 @ | — |
| Rosin, grade K, 280 lb. | bbl. | 5.55 @ | — |
| Pigmentar, tank cars | gal. | .19 @ | — |
| in drums | gal. | .25 @ | .27 |
| R. S. L. Resin | lb. | — @ | — |
| Retort Pine Tar, drums | bbl. | 12.00 @ | 13.00 |
| **Solvents** | | | |
| Acetone, pure | lb. | .12½ @ | .13½ |
| Alcohol, denatured, methanol, No. 1 bbls. | gal. | .29½ @ | — |
| Benzene, 90% | gal. | .15 @ | .24 |
| Beta-Trichlorethane | gal. | — @ | — |
| Bondogen | lb. | — @ | — |
| Carbon, bisulfide | lb. | .05½ @ | .06 |
| Carbon, tetrachloride | lb. | .05 @ | .05¼ |
| Dichlorethylene | lb. | .29 @ | — |
| Dipentene, cml., drums | gal. | .41 @ | .44 |
| Dryolene (f.o.b. Okla.) | gal. | .10 @ | .10½ |
| Ethylene dichloride | lb. | .05½ @ | .06½ |
| Gasoline, steel bbls. | gal. | .16 @ | — |
| Naphtha, solvent | gal. | .26 @ | .31 |
| Plastogen | lb. | | |
| Reogen | lb. | | |
| Rub-Sol (f.o.b. Okla.) | gal. | .09 @ | — |
| Trichlorethylene | lb. | — @ | .09½ |
| Turpentine, spirits | gal. | .46½ @ | .50½ |
| dest. dist., drums | gal. | .45 @ | .48 |
| **Waxes** | | | |
| Beeswax, white | lb. | .40 @ | .41 |
| Carnauba, yellow | lb. | .39 @ | .40 |
| Ceresin, white, dom. | lb. | .08 @ | .11 |
| Montan, crude | lb. | .10 @ | .11 |
| **Paraffin (c.l.—f.o.b. N. Y.)** | | | |
| Yellow crude scale | lb. | .02 @ | .02½ |
| White crude scale 124/126 | lb. | .02 @ | .02½ |
| Refined, 125/127 | lb. | .03¼ @ | .04 |

### ANTI-OXIDANTS

| | | | |
|---|---|---|---|
| AgeRite, Gel | lb. | | |
| HP | lb. | | |
| Powder | lb. | | |
| Resin | lb. | | |
| White | lb. | | |
| Albasan | lb. | .70 @ | .75 |
| Antox | lb. | | |
| B-L-E | lb. | .57 @ | .60 |
| Flectol-H | lb. | — @ | — |
| Flectol White | lb. | — @ | — |
| Flectol B | lb. | — @ | — |
| Neozone | lb. | | |
| Oxynone | lb. | .66 @ | .90 |
| Retardex | lb. | .35 @ | .40 |
| Stabilite | lb. | .57 @ | .62 |
| Stabilite Alba | lb. | .70 @ | .75 |
| VGB | lb. | .55 @ | .60 |

### MOLD LUBRICANTS

| | | | |
|---|---|---|---|
| Aresklene | lb. | — @ | — |
| Cocoa Soapstock | lb. | .06 @ | .08 |
| Dipex | lb. | .06 @ | .08 |
| Laurex | lb. | .24 @ | .30 |
| Rusco, f.o.b. Nitro | lb. | .12 @ | .30 |
| Sericite, f.o.b. N. Y. | ton | 65.00 @ | — |
| Soap Tree Bark, cut, sifted | lb. | .06 @ | .08 |
| Zip (Mold Wash) | lb. | — @ | — |

### FACTICE OR RUBBER SUBSTITUTES

| | | | |
|---|---|---|---|
| Amberex | lb. | .23 @ | — |
| Black | lb. | .08½ @ | — |
| White | lb. | .08 @ | .12 |
| Brown | lb. | .07 @ | .11½ |
| Duphax | lb. | .09½ @ | — |

### VULCANIZING INGREDIENTS

| | | | |
|---|---|---|---|
| Sulfur Chloride, yellow (drs.) | lb. | .03½ @ | .04 |
| Sulfur flour. | | | |
| Refined. 100% pure (bags) | cwt. | 3.45 @ | — |
| Commercial (bags) | cwt. | 1.95 @ | 2.80 |
| Telloy | lb. | | |
| Vandex | lb. | | |

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

# STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

## U. S. Imports and Exports of Crude Rubber

| YEARS | Gross Imports: Long Tons | Gross Imports: Total Declared Value | Gross Imports: Average Declared Value per pound Cents | Re-exports: Long Tons | Re-exports: Total Declared Value | Re-exports: Average Declared Value per pound Cents | Net Imports: Long Tons |
|---|---|---|---|---|---|---|---|
| 1922 | 301,076 | 101,843,188 | 15.10 | 4,809 | 1,921,828 | 17.84 | 296,267 |
| 1923 | 309,144 | 185,060,304 | 26.72 | 8,772 | 5,672,319 | 28.87 | 300,372 |
| 1924 | 328,056 | 174,231,331 | 23.71 | 10,309 | 6,057,637 | 26.23 | 317,747 |
| 1925 | 396,642 | 429,705,014 | 48.36 | 14,827 | 19,847,753 | 59.76 | 381,815 |
| 1926 | 413,338 | 505,817,807 | 54.63 | 17,671 | 22,470,583 | 56.77 | 395,667 |
| 1927 | 426,258 | 339,874,774 | 35.60 | 27,775 | 24,735,488 | 39.76 | 398,483 |
| 1928 | 439,731 | 244,854,973 | 25.03 | 32,159 | 18,128,361 | 25.17 | 407,572 |
| 1929 | 560,084 | 239,178,783 | 19.15 | 36,485 | 16,868,733 | 20.64 | 523,599 |
| 1930 | 482,082 | 139,134,330 | 12.89 | 30,205 | 9,316,205 | 13.77 | 451,877 |
| 1931 | 497,138 | 72,918,949 | 6.54 | 25,595 | 4,255,472 | 7.42 | 471,543 |
| 1932 | 409,584 | 31,936,459 | 3.47 | 20,929 | 2,015,612 | 4.30 | 388,655 |
| 1933 | 407,817 | 44,034,064 | 4.82 | 20,537 | 2,601,352 | 5.65 | 427,280 |
| 1934 | 449,322 | 97,898,519 | 10.06 | 23,848 | 5,770,109 | 11.23 | 425,615 |
| 1933: | | | | | | | |
| Sept. | 44,912 | 6,110,956 | 6.07 | 2,369 | 335,798 | 8.89 | 42,543 |
| Oct. | 44,474 | 6,115,330 | 6.14 | 2,669 | 397,167 | 6.64 | 41,805 |
| Nov. | 40,582 | 5,850,714 | 6.44 | 2,188 | 333,631 | 6.81 | 38,394 |
| Dec. | 39,461 | 5,869,556 | 6.75 | 1,888 | 293,690 | 6.94 | 37,573 |
| 1934: | | | | | | | |
| Jan. | 47,963 | 7,403,123 | 6.89 | 1,975 | 352,116 | 7.96 | 45,988 |
| Feb. | 34,335 | 5,262,711 | 6.84 | 2,133 | 476,232 | 9.97 | 32,202 |
| Mar. | 41,119 | 6,765,173 | 7.34 | 2,947 | 583,313 | 8.83 | 38,172 |
| April | 43,841 | 8,232,746 | 8.37 | 2,814 | 588,453 | 9.18 | 41,027 |
| May | 48,494 | 10,001,239 | 9.21 | 2,389 | 544,212 | 10.17 | 46,105 |
| June* | 47,289 | 10,747,464 | 10.14 | 2,012 | 501,499 | 11.33 | 45,277 |
| July | 41,443 | 9,670,617 | 10.41 | 2,366 | 660,199 | 13.99 | 39,077 |
| August | 31,531 | 7,873,690 | 11.15 | 1,393 | 400,433 | 12.83 | 30,138 |
| Sept. | 31,074 | 8,293,859 | 11.92 | 1,665 | 474,446 | 12.72 | 29,409 |
| Oct. | 28,318 | 8,203,447 | 12.92 | 2,058 | 620,754 | 13.46 | 26,260 |
| Nov. | 36,325 | 10,470,076 | 12.87 | 1,230 | 327,672 | 11.89 | 35,095 |
| Dec. | 17,590 | 4,974,374 | 12.62 | 866 | 240,780 | 12.46 | 16,724 |
| 1935: | | | | | | | |
| Jan. | 39,675 | 10,852,308 | 12.21 | 977 | 278,229 | 12.72 | 38,698 |
| Feb. | 47,271 | 12,291,242 | 11.61 | 1,845 | 480,440 | 11.62 | 45,426 |
| March | 45,350 | 11,801,152 | 11.62 | 1,868 | 486,379 | 11.62 | 43,482 |
| April | 39,735 | 10,096,487 | 11.34 | 1,096 | 285,903 | 11.64 | 38,639 |
| May | 29,278 | 7,171,025 | 10.98 | 793 | 202,402 | 11.39 | 28,485 |
| June | 31,240 | 7,523,598 | 10.75 | 524 | 153,595 | 13.10 | 30,716 |
| July | 46,987 | 11,666,577 | 11.08 | 489 | 132,173 | 12.06 | 46,498 |
| August | 40,249 | 10,419,056 | 11.56 | 476 | 130,464 | 12.23 | 39,773 |
| Sept. | 34,659 | 8,637,048 | 11.12 | 468 | 120,438 | 11.48 | 34,191 |

* Revised.

## United States Imports of Guayule, Balata, Jelutong, Liquid Latex

*(All Quantities in Long Tons)*

| | Guayule Tons | Guayule Dollars | Balata Tons | Balata Dollars | Jelutong Tons | Jelutong Dollars | Liquid Latex (1) Tons | Liquid Latex (1) Dollars |
|---|---|---|---|---|---|---|---|---|
| 1924 | 1,356 | 536,392 | 464 | 568,456 | 6,165 | 1,237,100 | 2,157 | 864,059 |
| 1925 | 3,781 | 1,803,448 | 517 | 574,750 | 6,749 | 1,642,531 | 3,853 | 3,537,810 |
| 1926 | 4,305 | 2,562,096 | 354 | 327,213 | 7,263 | 3,127,757 | 3,388 | 4,680,386 |
| 1927 | 5,018 | 2,674,957 | 582 | 447,246 | 7,785 | 2,448,657 | 1,116 | 876,077 |
| 1928 | 3,075 | 1,755,685 | 731 | 430,855 | 7,552 | 2,540,059 | 4,167 | 2,185,579 |
| 1929 | 1,231 | 545,175 | 728 | 566,964 | 8,203 | 2,458,136 | 3,728 | 1,787,997 |
| 1930 | 1,096 | 347,388 | 501 | 422,684 | 5,907 | 1,403,244 | 4,449 | 1,506,804 |
| 1931 | —— | —— | 1,208 | 411,692 | 5,777 | 1,019,010 | 4,650 | 884,355 |
| 1932 | —— | —— | 708 | 147,403 | 4,607 | 616,596 | 5,085 | 601,999 |
| 1933 | —— | —— | 1,658 | 2,261,869 | 5,989 | 944,895 | 11,085 | 1,833,671 |
| 1934 | 402 | 75,349 | 1,054 | 438,209 | 4,988 | 943,752 | 13,070 | 3,633,253 |
| 1934: | | | | | | | | |
| Oct. | —— | —— | 14 | 2,797 | 278 | 48,287 | 922 | 282,503 |
| Nov. | —— | —— | 60 | 20,169 | 332 | 60,904 | 887 | 296,447 |
| Dec. | —— | —— | 6 | 2,458 | 192 | 31,947 | 581 | 184,588 |
| 1935: | | | | | | | | |
| Jan. | —— | —— | 81 | 34,687 | 448 | 80,097 | 848 | 287,583 |
| Feb. | —— | —— | 62 | 20,981 | 222 | 33,850 | 573 | 179,583 |
| March | —— | —— | 57 | 15,917 | 488 | 80,643 | 1,290 | 354,654 |
| April | —— | —— | 51 | 11,452 | 419 | 58,429 | 1,721 | 415,100 |
| May | 51 | 9,464 | 62 | 12,931 | 332 | 51,805 | 1,427 | 380,844 |
| June | 105 | 19,502 | 75 | 23,809 | 330 | 50,165 | 591 | 152,665 |
| July | 51 | 9,800 | 49 | 15,758 | 388 | 62,736 | 1,144 | 303,518 |
| August | 50 | 9,464 | 31 | 8,963 | 445 | 82,179 | 1,234 | 370,431 |
| Sept. | 18 | 3,245 | 29 | 6,090 | 1,682 | 407,418 | 1,048 | 291,652 |

(1) Weight given in pounds of dry rubber contained in latex.

## U. S. Consumption of Crude Rubber

*(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)*
*(All Quantities in Long Tons)*

| | Figures on Monthly Basis: 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 |
|---|---|---|---|---|---|---|---|---|
| Jan. | 34,403 | 43,002 | 36,194 | 28,557 | 29,648 | 22,645* | 39,284* | 47,103 |
| Feb. | 33,702 | 41,594 | 33,302 | 28,797 | 31,821 | 21,392* | 40,609 | 43,187 |
| Mar. | 35,688 | 44,730 | 35,540 | 32,788 | 29,505 | 17,483* | 47,097 | 42,620 |
| Apr. | 32,772 | 47,521 | 39,686 | 33,321 | 27,518 | 25,928 | 44,853* | 44,714 |
| May | 37,333 | 49,233 | 39,386 | 37,817 | 30,957 | 44,074 | 42,918* | 41,568 |
| June | 37,676 | 43,227 | 34,195 | 37,916 | 41,475 | 50,743* | 40,147* | 36,623 |
| July | 37,407 | 41,526 | 29,508 | 31,397 | 29,976 | 49,614* | 32,553* | 36,384 |
| Aug. | 42,927 | 38,274 | 30,850 | 27,586 | 23,721 | 44,428* | 33,216* | 39,242 |
| Sept. | 39,882 | 34,707 | 25,515 | 23,638 | 23,847 | 35,281* | 30,258* | 37,553 |
| Oct. | 40,857 | 34,800 | 27,516 | 22,277 | 22,286 | 31,543* | 31,347 | |
| Nov. | 37,461 | 27,659 | 23,691 | 22,943 | 23,231 | 28,831* | 34,842 | |
| Dec. | 31,232 | 25,531 | 21,687 | 21,409 | 18,015 | 28,757* | 36,662 | |
| Tot. | 441,340 | 469,804 | 375,980 | 348,986 | 332,000 | 400,719* | 454,350* | |

* Revised.

## Reclaimed Rubber in the United States

*(All Quantities in Long Tons)*

| Year | Production | Consumption Tons | Consumption % to Crude | Stocks* | Year | Production | Consumption Tons | Consumption % to Crude | Stocks* |
|---|---|---|---|---|---|---|---|---|---|
| 1925 | 132,930 | 137,105 | 35.6 | 13,203 | 1930 | 157,967 | 153,497 | 40.8 | 22,006 |
| 1926 | 180,582 | 164,500 | 45.9 | 23,213 | 1931 | 133,351 | 124,126 | 33.9 | 19,257 |
| 1927 | 189,144 | 178,471 | 47.6 | 24,980 | 1932 | 75,608 | 77,504 | 23.4 | 16,354 |
| 1928 | 208,516 | 223,000 | 50.4 | 24,785 | 1933 | 99,560 | 81,602 | 19.9 | 20,746 |
| 1929 | 218,954 | 226,588 | 48.4 | 27,464 | 1934 | 110,010 | 100,597 | 22.3 | 23,079 |

| | Figures on Monthly Basis: Production | Consumption Tons | Consumption % to Crude | Stocks* | | Production | Consumption Tons | Consumption % to Crude | Stocks* |
|---|---|---|---|---|---|---|---|---|---|
| 1934: | | | | | | | | | |
| Jan. | 9,828 | 7,000 | 17.8a | 24,263 | July | 9,446 | 8,175 | 25.1a | 24,926 |
| Feb. | 9,504 | 7,646 | 18.8 | 23,356 | Aug. | 8,160 | 8,493 | 25.5 | 24,607 |
| Mar. | 11,479 | 9,683 | 20.6 | 25,113 | Sept. | 6,974 | 7,028 | 23.2 | 24,540 |
| Apr. | 10,185 | 9,387 | 20.9 | 22,033 | Oct. | 8,145 | 8,167 | 26.1 | 24,511 |
| May | 10,848 | 9,500 | 22.1 | 22,887 | Nov. | 7,268 | 7,775 | 22.3 | 23,999 |
| June | 10,820 | 9,459 | 23.5 | 23,664 | Dec. | 7,353 | 8,284 | 22.6 | 23,079 |
| 1935: | | | | | | | | | |
| Jan. | 10,465 | 11,261 | 23.9 | 22,291 | July | 8,421 | 8,396 | 23.1 | 17,810 |
| Feb. | 10,072 | 9,374 | 23.3 | 22,989 | Aug. | 9,557 | 8,795 | 22.4 | 18,272 |
| Mar. | 10,549 | 9,741 | 22.9 | 20,637 | Sept. | 9,041 | 8,774 | 23.4 | 18,260 |
| Apr. | 10,315 | 10,466 | 23.4 | 18,716a | Oct. | ..... | ..... | ... | ..... |
| May | 10,223 | 9,938 | 23.9 | 18,541 | Nov. | ..... | ..... | ... | ..... |
| June | 8,590 | 8,710 | 23.8 | 17,932 | Dec. | ..... | ..... | ... | ..... |

* Stocks on hand at the end of month or year.
a Revised.

## U. S. Consumption of Gasoline

*(Bureau of Mines Statistics)*
*(In Thousands of Barrels of 42 Gallons)*

| | 1933 * | 1934 * | 1935 | | 1933 * | 1934 * | 1935 |
|---|---|---|---|---|---|---|---|
| January .... | 26,397 | 29,489 | 28,062 | August .... | 37,400 | 39,105 | 42,836* |
| February .. | 23,320 | 25,310 | 26,432 | September . | 34,580 | 34,669 | 37,862 |
| March ..... | 28,123 | 30,577 | 31,997 | October .... | 33,022 | 37,674 | |
| April ..... | 29,791 | 32,736 | 36,076 | November . | 30,312 | 34,998 | |
| May ..... | 33,709 | 38,071 | 39,089 | December . | 28,572 | 30,581 | |
| June ..... | 37,699 | 36,430 | 37,884 | | | | |
| July ..... | 34,087 | 37,466 | 41,203 | Total .... | 377,003 | 407,106 | |

* Revised on basis of final annual figures issued by Bureau of Mines.

## Rims Inspected and Passed in U. S.

*(Tire and Rim Association Reports)*

| | Total | | Total | | Total |
|---|---|---|---|---|---|
| 1924 ..... | 21,863,311 | 1928 ..... | 24,247,282 | 1932 ..... | 6,261,336 |
| 1925 ..... | 26,001,664 | 1929 ..... | 24,141,502 | 1933 ..... | 8,713,962 |
| 1926 ..... | 24,199,524 | 1930 ..... | 17,364,096 | 1934 ..... | 12,255,118 |
| 1927 ..... | 19,700,003 | 1931 ..... | 11,253,800 | 1935 ..... | ..... |

| 1935: | | 1935: | | 1935: | |
|---|---|---|---|---|---|
| January ... | 1,868,723 | May ..... | 1,561,434 | September . | 1,052,044 |
| February .. | 1,616,398 | June ..... | 1,428,314 | October ... | 1,648,757 |
| March ..... | 1,724,077 | July ..... | 1,339,353 | November . | ..... |
| April ..... | 1,907,032 | August .... | 797,827 | December .. | ..... |

## Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | Ave. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1933** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| July | 6½ | 7¾ | — | — | 6⅞ | 7½ | 7⅝ | 7⅝ | — | 7⅞ | 7½ | 7⅝ | 8⅛ | 8⅝ | 8⅝ | — | 9⅜ | 9⅝ | 8⅞ | 8⅝ | 7⅞ | 7½ | — | 8⅞ | 8⅝ | 8⅝ | 8⅝ | 7⅞ | 7 | — | 7 | 8 |
| August | 7½ | 7¾ | — | — | 7 | 7⅛ | 7⅛ | 7⅛ | 7¾ | 7⅞ | 7⅝ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 6⅛ | 6⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7¾ | 7¾ | 7⅛ |
| September | 7¾ | — | 8 | 7⅝ | 7⅝ | — | 6¾ | 6⅝ | — | 6⅝ | — | 6⅝ | 6⅝ | 7⅛ | — | 6⅛ | 6⅛ | 7⅛ | 6⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 7⅛ | 8⅛ | 7¾ | 7⅛ |
| October | 7⅞ | 7⅝ | 8 | 8 | 7⅝ | 7⅛ | 8 | 8⅛ | 8⅛ | 8½ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 9 | 9⅛ | 9⅛ | 9⅛ | 7⅛ | 9⅛ | 9 | 8⅛ | 8⅛ | 9⅛ | 9⅛ | 9⅛ | 8½ | 8½ | 9⅛ | 9⅛ | 7¾ | 7¾ |
| November | 7⅞ | 8 | 8 | 8⅛ | 8 | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 8⅛ | 8⅛ | 9⅛ | 9⅛ | 7¾ | 7¾ |
| December | 9¼ | 9¼ | — | 9¼ | 9⅛ | 8⅛ | 9⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ |
| **1934** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| January | 9 | 9⅞ | 8⅛ | 9 | 9 | 9 | 10⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | 8⅛ | — | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 10⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 9⅛ | 10⅛ | 10 | 10 | 10 | 9⅛ |
| February | 10 | 10⅛ | 9⅛ | — | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | — | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | — | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | 10⅛ | — | — | — | 10⅛ |
| March | 10⅞ | 11⅛ | 10⅛ | — | 10⅛ | 10⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11 |
| April | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 12 | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ |
| May | 14⅛ | 14⅛ | 14⅛ | 15 | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 14 | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ | 13⅞ |
| June | 13 | 14 | — | 12⅝ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ |
| July | 14 | 14⅞ | 14⅛ | — | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ |
| August | 14⅛ | 14⅞ | 15 | — | 14⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ |
| September | 14½ | 14½ | 13⅞ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ | 15⅛ |
| October | 14½ | 13⅞ | 13 | 14 | 13⅛ | 13⅛ | 14 | 14 | 13⅛ | 13⅛ | 14⅛ | 14⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 14⅛ | 14⅛ | 14⅛ | 14 | 14 | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14⅛ | 14 | 13⅞ | 13 | 14 |
| November | 13⅛ | 13⅛ | 12⅞ | 13 | 13 | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 13 | 13 | 13 | 13 | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 13 | 13⅛ | 13⅛ | 13 |
| December | 13⅛ | — | — | — | 13 | 13⅛ | 13⅛ | 13⅛ | — | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 13 | — | 12⅞ | 13 | 13 | 13 | 13 | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 13⅛ | 13⅛ | 13 |
| **1935** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| January | 13⅛ | 13½ | 13½ | 13½ | 13½ | — | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13¼ | — | 13⅛ | 12⅞ | 13⅛ | 13⅛ | 13⅛ | 13 | 13 | 13 | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 12⅞ | 13⅛ |
| February | 12¾ | 12¾ | 12⅝ | 12¾ | 12¾ | 12⅝ | 12⅝ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ | 13⅛ |
| March | 11⅜ | 11⅞ | 11⅞ | 12⅛ | 12⅛ | 12 | 12 | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ |
| April | 11⅜ | 11⅝ | 11⅞ | 11⅞ | 11 | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ | 11⅛ |
| May | 11⅞ | 11⅞ | 11⅞ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ |
| June | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ | 12⅛ |
| July | 12⅛ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ | 12¾ |
| August | 12⅛ | 12¾ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11⅞ | 12⅛ | 12 | 12 | 12 | 12 | 12 | 12⅛ | 12⅛ | 12⅛ |
| September | 11¾ | 11¾ | 11⅝ | 11⅝ | 12 | 12⅛ | 11⅞ | 12 | 12 | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 11⅝ | 12 | 11⅞ | 11⅞ | 11⅞ | 11⅞ | 11⅞ | 11⅞ | 11⅞ | — | 11⅞ |
| October | 13¾ | 13⅛ | — | 13⅜ | — | — | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ | 13⅜ |

## Average Spot Closing Prices—Ribbed Smoked Sheets

*(New York Market)*

### Average Price per Pound for Years 1910-1929

| Year | Cents | Year | Cents | Year | Cents | Year | Cents | Year | Cents |
|---|---|---|---|---|---|---|---|---|---|
| 1910 | 206.60 | 1914 | 65.33 | 1918 | 60.15 | 1922 | 17.50 | 1926 | 48.50 |
| 1911 | 141.30 | 1915 | 65.85 | 1919 | 48.70 | 1923 | 29.45 | 1927 | 37.72 |
| 1912 | 121.60 | 1916 | 72.50 | 1920 | 36.30 | 1924 | 26.20 | 1928 | 22.48 |
| 1913 | 82.04 | 1917 | 72.23 | 1921 | 16.36 | 1925 | 72.46 | 1929 | 20.55 |

### Average Monthly Price per Pound Since 1928

| | 1929 Cents | 1930 Cents | 1931 Cents | 1932 Cents | 1933 Cents | 1934 Cents | 1935 Cents |
|---|---|---|---|---|---|---|---|
| Jan. | 20.14 | 15.24 | 8.34 | 4.38 | 3.08 | 9.32 | 13.10 |
| Feb. | 23.7 | 15.85 | 7.70 | 4.03 | 2.95 | 10.45 | 12.92 |
| Mar. | 24.55 | 15.34 | 7.71 | 3.35 | 3.01 | 11.01 | 11.51 |
| Apr. | 21.18 | 14.93 | 6.43 | 3.02 | 3.56 | 12.10 | 11.55 |
| May | 21.46 | 14.24 | 6.49 | 3.09 | 4.95 | 13.26 | 12.05 |
| June | 20.64 | 12.45 | 6.35 | 2.66 | 6.15 | 13.51 | 12.57 |
| July | 21.30 | 11.24 | 6.37 | 2.89 | 8.01 | 14.60 | 12.10 |
| Aug. | 20.59 | 9.96 | 5.38 | 3.63 | 7.31 | 15.47 | 11.98 |
| Sept. | 20.37 | 8.28 | 5.08 | 3.84 | 7.30 | 15.36 | 11.55 |
| Oct. | 19.67 | 8.20 | 4.87 | 3.65 | 7.64 | 13.96 | 12.62 |
| Nov. | 16.62 | 9.01 | 4.65 | 3.44 | 8.66 | 13.04 | |
| Dec. | 16.12 | 9.05 | 4.64 | 3.24 | 8.87 | 12.98 | |
| Average for Year | 20.55 | 11.98 | 6.17 | 3.49 | 5.96 | 12.92 | |

## London Closing Prices of Ribbed Smoked Sheets

*(In Pence Per Pound)*

| Day | Aug. | Sept. | Oct. | Nov. | Day | Aug. | Sept. | Oct. | Nov. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5⅛ | — | 5⅛ | 6⅛ | 17 | — | 5⅜ | 6¼ | |
| 2 | 5¾ | 5⅜ | 5⅝ | 6⅜ | 18 | — | 5⅜ | 6¼ | |
| 3 | — | 5⅜ | 5⅛ | — | 19 | 5⅜ | 5⅛ | 6¼ | |
| 4 | — | 5⅜ | 5⅛ | 6⅛ | 20 | 5⅜ | 5½ | — | |
| 5 | — | 5½ | 5⅛ | 6⅜ | 21 | 5⅛ | 5⅜ | 6¼ | |
| 6 | 5⅛ | 5⅛ | — | 6⅜ | 22 | 5⅛ | — | 6¼ | |
| 7 | 5¾ | 5⅛ | 5⅛ | 6⅛ | 23 | — | 5⅞ | 6⅜ | |
| 8 | 5⅛ | — | 5⅛ | 6⅛ | 24 | — | 5¾ | 6⅜ | |
| 9 | 5¾ | 5½ | 5⅛ | 6⅜ | 25 | — | 5⅛ | 6⅜ | |
| 10 | — | 5⅞ | 6 | — | 26 | 5⅛ | 5¾ | 6⅞ | |
| 11 | — | 5½ | 6⅛ | | 27 | 5⅝ | 5⅛ | — | |
| 12 | 5¾ | 5⅞ | 6⅛ | | 28 | 5⅝ | 5¾ | 6⅞ | |
| 13 | 5⅛ | 5⅜ | — | | 29 | 5⅛ | — | 6⅜ | |
| 14 | 5⅛ | 5⅜ | 6⅛ | | 30 | 5⅜ | 5¾ | 6½ | |
| 15 | 5⅛ | — | 6⅛ | | 31 | — | — | 6⅜ | |
| 16 | 5⅛ | 5⅛ | 6⅛ | | | | | | |

### Average Monthly Price Per Pound

| Month | 1932 Pence | 1933 Pence | 1934 Pence | 1935 Pence | Month | 1932 Pence | 1933 Pence | 1934 Pence | 1935 Pence |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 3.052 | 2.264 | 4.429 | 6.434 | Aug. | 2.654 | 3.811 | 7.401 | 5.696 |
| Feb. | 2.760 | 2.093 | 4.920 | 6.292 | Sept. | 2.485 | 3.728 | 7.409 | 5.508 |
| Mar. | 2.047 | 2.099 | 5.136 | 5.745 | Oct. | 2.425 | 3.957 | 6.806 | 6.130 |
| Apr. | 1.876 | 2.323 | 5.712 | 5.604 | Nov. | 2.518 | 4.096 | 6.294 | |
| May | 1.825 | 2.966 | 6.207 | 5.822 | Dec. | 2.444 | 4.200 | 6.295 | |
| June | 1.750 | 3.392 | 6.245 | 6.027 | Average for Year | 2.434 | 3.233 | 6.159 | |
| July | 1.875 | 3.860 | 7.053 | 5.801 | | | | | |

## Spot Closing Cotton Prices

*(Middling Upland Grade—New York Market)*

### Recent Daily Price Per Pound

| Date | Sept. | Oct. | Nov. | Date | Sept. | Oct. | Nov. | Date | Sept. | Oct. | Nov. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | — | 11.05 | 11.40 | 11 | 10.85 | 11.20 | | 21 | 10.80 | 11.15 | |
| 2 | — | 11.40 | 11.35 | 12 | 10.80 | — | | 22 | — | 11.20 | |
| 3 | 10.65 | 11.30 | — | 13 | 10.75 | — | | 23 | 10.85 | 11.40 | |
| 4 | 10.70 | 11.35 | 11.35 | 14 | 10.65 | 11.20 | | 24 | 10.90 | 11.35 | |
| 5 | 10.65 | 11.35 | — | 15 | — | 11.25 | | 25 | 10.90 | 11.30 | |
| 6 | 10.75 | — | 11.45 | 16 | 10.65 | 11.25 | | 26 | 10.85 | 11.30 | |
| 7 | 10.70 | 11.40 | 11.55 | 17 | 10.80 | 11.15 | | 27 | 10.75 | — | |
| 8 | — | 11.30 | 11.70 | 18 | 11.00 | 11.25 | | 28 | 10.75 | 11.25 | |
| 9 | 10.75 | 11.30 | 11.80 | 19 | 11.00 | 11.20 | | 29 | — | 11.35 | |
| 10 | 10.85 | 11.30 | — | 20 | 10.95 | — | | 30 | 10.80 | 11.35 | |
| | | | | | | | | 31 | — | 11.40 | |

### Average Monthly Price Per Pound

| | 1932 Cents | 1933 Cents | 1934 Cents | 1935 Cents | | 1932 Cents | 1933 Cents | 1934 Cents | 1935 Cents |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 6.65 | 6.23 | 11.25 | 12.70 | Aug. | 7.43 | 9.55 | 13.40 | 11.48 |
| Feb. | 6.85 | 6.05 | 12.28 | 12.58 | Sept. | 6.30 | 9.64 | 13.00 | 10.80 |
| Mar. | 6.86 | 6.39 | 12.30 | 11.63 | Oct. | 6.30 | 9.58 | 12.48 | 11.28 |
| Apr. | 6.16 | 7.02 | 11.80 | 11.73 | Nov. | 6.22 | 10.04 | 12.53 | |
| May | 5.72 | 8.64 | 11.44 | 12.25 | Dec. | 6.00 | 10.17 | 12.76 | |
| June | 5.02 | 9.47 | 12.20 | 11.89 | Average for Year | 6.41 | 8.63 | 12.36 | |
| July | 5.87 | 10.76 | 12.84 | 12.26 | | | | | |

# World Stocks of Crude Rubber

## ON HAND OR AFLOAT TO THE U. S.

| At End of | ON HAND 1933 | ON HAND 1934 | ON HAND 1935 | AFLOAT 1933 | AFLOAT 1934 | AFLOAT 1935 | ON HAND AND AFLOAT 1933 | ON HAND AND AFLOAT 1934 | ON HAND AND AFLOAT 1935 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 396,376 | 368,660 | 346,084 | 32,539 | 45,768 | 42,066 | 428,915 | 414,428 | 388,150 |
| Feb. | 381,794 | 358,681* | 339,335* | 32,898 | 53,063 | 42,969 | 414,692 | 411,744* | 382,304* |
| Mar. | 390,135 | 352,897* | 338,700 | 29,531 | 54,722 | 44,485 | 419,666 | 407,619* | 383,185 |
| Apr. | 382,167 | 351,073* | 334,954 | 30,745 | 56,251 | 37,651 | 412,912 | 407,324* | 372,605 |
| May | 364,623 | 350,935* | 319,281 | 43,342 | 57,921 | 44,375 | 407,965 | 409,250 | 363,656 |
| June | 333,954 | 358,461* | 320,470 | 63,608 | 46,698 | 55,581 | 397,562 | 404,847 | 376,051 |
| July | 326,609 | 365,072 | 330,528 | 57,435 | 45,869 | 49,018 | 384,044 | 410,941 | 379,546 |
| Aug. | 325,148 | 363,711* | 329,548 | 53,084 | 40,278 | 47,724 | 378,232 | 403,989* | 377,272 |
| Sept. | 334,637 | 360,623* | 326,236 | 57,255 | 38,831 | 43,413 | 391,982 | 399,454 | 369,649 |
| Oct. | 343,579 | 362,018 | | 58,568 | 38,247 | | 402,147 | 400,265 | |
| Nov. | 353,852 | 361,236 | | 57,140 | 38,625 | | 410,992 | 399,861 | |
| Dec. | 364,541 | 352,632 | | 55,606 | 47,644 | | 419,147 | 400,276 | |

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

## STOCKS IN GREAT BRITAIN

### Stocks in London

*(No. of Tons in Wharves and Warehouses, including Latex)*

| At end of | 1933 | 1934 | 1935 | At end of | 1933 | 1934 | 1935 |
|---|---|---|---|---|---|---|---|
| Jan. | 36,481 | 38,570 | 81,807 | July | 41,178 | 50,490 | 99,226 |
| Feb. | 37,182 | 38,752 | 87,605 | Aug. | 39,480 | 48,953 | 101,574 |
| Mar. | 40,689 | 40,501 | 92,664 | Sept. | 39,237 | 56,103 | 101,198 |
| Apr. | 40,911 | 42,413 | 94,361 | Oct. | 37,101 | 63,079 | |
| May | 41,998 | 42,190 | 95,722 | Nov. | 36,139 | 67,656 | |
| June | 43,032 | 45,674 | 98,077 | Dec. | 35,615 | 72,285 | |

### At End of Recent Weeks

| | First Saturday | Second Saturday | Third Saturday | Fourth Saturday | Fifth Saturday |
|---|---|---|---|---|---|
| 1935 | | | | | |
| June | 96,067 | 96,463 | 96,749 | 97,385 | 97,112 |
| July | 98,302 | 98,784 | 97,934 | 98,342 | |
| Aug. | 98,950 | 99,423 | 100,533 | 99,860 | 100,972 |
| Sept. | 101,246 | 101,709 | 101,357 | 100,542 | |
| Oct. | 100,635 | 100,405 | 97,642 | 94,560 | |

### Stocks in Liverpool

| | | | | | |
|---|---|---|---|---|---|
| 1935 | | | | | |
| June | 71,839 | 72,605 | 73,338 | 73,569 | 73,257 |
| July | 74,211 | 74,527 | 74,250 | 74,766 | |
| Aug. | 74,948 | 75,778 | 75,752 | 75,503 | 75,733 |
| Sept. | 76,012 | 76,303 | 76,396 | 76,416 | |
| Oct. | 76,746 | 76,139 | 76,092 | 76,070 | |

## STOCKS IN PENANG AND SINGAPORE

*(Stocks held by Dealers—Quantities in Long Tons)*

| End of | 1932 | 1933 | 1934 | 1935 | End of | 1932 | 1933 | 1934 | 1935 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 48,850 | 22,525 | 40,405 | 50,588 | July | 17,017 | 36,972 | 65,099 | 41,266 |
| Feb. | 46,954 | 21,530 | 41,884 | 51,628 | Aug. | 20,649 | 38,601 | 59,227 | 36,117 |
| Mar. | 46,591 | 24,594 | 47,933 | 46,046 | Sep. | 20,415 | 36,948 | 54,905 | 29,122 |
| Apr. | 39,663 | 25,460 | 48,431 | 43,295 | Oct. | 23,158 | 37,282 | 54,155 | |
| May | 38,690 | 29,822 | 76,393 | 45,625 | Nov. | 25,419 | 39,018 | 49,282 | |
| June | 19,770 | 34,676 | 73,218 | 43,866 | Dec. | 25,341 | 38,269 | 51,255 | |

## STOCKS IN OTHER CENTRES

| End of: 1934 | Malaya Mainland | Holland | Colombo | Para and Manaos |
|---|---|---|---|---|
| Nov. | 33,590 | 1,404 | 5,631 | 3,081 |
| Dec. | 23,173 | 1,326 | 5,732 | 3,293 |
| Jan., 1935 | 33,609 | 1,397 | 5,926 | 3,477 |
| Feb. | 32,062 | 1,534 | 4,753 | 3,153 |
| Mar. | 31,844 | 1,551 | 3,917 | 3,214 |
| Apr. | 33,583 | 1,536 | 4,245 | 3,019 |
| May | 31,896 | 1,499 | 4,910 | 2,643 |
| June | 33,823 | 1,481 | 4,659 | 2,012 |
| July | 33,949 | 1,448 | 4,700 | 1,222 |
| August | 30,660 | 1,455 | 4,866 | 965 |
| Sept. | 29,986 | 1,442 | | |

## RUBBER STOCKS AFLOAT

| End of: 1934 | Afloat for United States | Afloat for Europe | All Other * Afloat | Total * Afloat |
|---|---|---|---|---|
| June | 46,698 | 36,870 | 26,910 | 110,478 |
| July | 45,869 | 35,430 | 15,355 | 96,654 |
| August | 40,278 | 36,060 | 21,001 | 97,349 |
| September | 38,831 | 39,630 | 35,215 | 113,716 |
| October | 38,247 | 40,560 | 20,061 | 98,868 |
| November | 38,625 | 39,870 | 21,342 | 99,837 |
| December | 47,644 | 41,200 | 36,132 | 124,976 |
| End of: 1935 | | | | |
| January | 42,066 | 35,600 | 35,334 | 113,000 |
| February | 42,969 | 28,750 | 31,281 | 103,000 |
| March | 44,485 | 30,400 | 17,115 | 92,000 |
| April | 37,651 | 31,400 | 28,949 | 98,000 |
| May | 44,375 | 30,300 | 28,325 | 103,000 |
| June | 55,581 | 27,485 | 16,934 | 101,000 |
| July | 49,018 | 29,150 | 17,832 | 96,000 |
| August | 47,724 | 28,000P | 25,276 | 101,000 |
| September | 43,413 | 28,000P | 28,587 | 100,000 |

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

P—Preliminary estimate.

# U. S. Tire and Tube Statistics[1]

*(All Figures Represent Thousands)*

## AUTOMOBILE CASINGS

### Figures for Recent Years

| | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 |
|---|---|---|---|---|---|---|---|---|
| Production | 64,439 | 77,944 | 68,726 | 50,965 | 48,739 | 40,085 | 45,304 | 47,233 |
| Shipments | 64,059 | 74,296 | 69,395 | 53,638 | 48,151 | 40,260 | 44,094 | 46,687 |
| Inventory[2] | 10,264 | 13,624 | 11,838 | 9,003 | 7,775 | 7,644 | 8,888 | 9,455 |

### Figures for Recent Months

| | PRODUCTION 1933 | PRODUCTION 1934 | PRODUCTION 1935 | SHIPMENTS 1933 | SHIPMENTS 1934 | SHIPMENTS 1935 | INVENTORY 1933 | INVENTORY 1934 | INVENTORY 1935 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 2,258 | 3,922 | 4,626 | 2,597 | 3,222 | 3,663 | 7,237 | 9,684 | 10,398 |
| Feb. | 2,339 | 4,335 | 4,383 | 2,292 | 3,285 | 3,287 | 7,377 | 10,725 | 11,530 |
| Mar. | 2,038 | 5,180 | 4,346 | 2,092 | 4,223 | 4,204 | 7,290 | 11,651 | 11,675 |
| Apr. | 3,123 | 4,470 | 4,512 | 3,654 | 4,438 | 5,144 | 6,778 | 11,981 | 11,003 |
| May | 5,189 | 4,456 | 4,175 | 5,180 | 5,332 | 4,067 | 6,760 | 11,127 | 11,131 |
| June | 6,100 | 4,342 | 3,910 | 6,305 | 5,228 | 4,262 | 6,615 | 10,219 | 10,755 |
| July | 5,714 | 3,353 | 3,532 | 5,497 | 4,157 | 5,447 | 6,844 | 9,437 | 8,850 |
| Aug. | 4,994 | 3,533 | 3,993 | 4,707 | 4,308 | 4,739 | 7,070 | 8,697 | 7,805 |
| Sept. | 3,999 | 2,936 | | 3,503 | 3,183 | | 7,595 | 8,419 | |
| Oct. | 3,249 | 3,287 | | 2,537 | 3,010 | | 8,462 | 8,657 | |
| Nov. | 3,039 | 3,341 | | 2,197 | 3,191 | | 9,247 | 8,779 | |
| Dec. | 3,082 | 3,778 | | 3,531 | 3,109 | | 8,888 | 9,455 | |

## AUTOMOBILE INNER TUBES

### Figures for Recent Years

| | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 |
|---|---|---|---|---|---|---|---|---|
| Production | 70,823 | 80,180 | 68,829 | 52,420 | 48,333 | 36,891 | 42,546 | 46,228 |
| Shipments | 72,896 | 77,127 | 70,592 | 54,938 | 50,021 | 37,911 | 41,391 | 45,046 |
| Inventory[2] | 13,692 | 16,117 | 12,807 | 9,999 | 7,922 | 6,749 | 7,815 | 9,180 |

### Figures for Recent Months

| | PRODUCTION 1933 | PRODUCTION 1934 | PRODUCTION 1935 | SHIPMENTS 1933 | SHIPMENTS 1934 | SHIPMENTS 1935 | INVENTORY 1933 | INVENTORY 1934 | INVENTORY 1935 |
|---|---|---|---|---|---|---|---|---|---|
| Jan. | 2,093 | 3,530 | 4,259 | 2,535 | 3,199 | 3,722 | 6,197 | 8,403 | 9,621 |
| Feb. | 2,224 | 4,077 | 4,171 | 2,102 | 3,323 | 3,362 | 6,357 | 8,445 | 10,466 |
| Mar. | 1,883 | 5,194 | 4,123 | 1,902 | 4,118 | 4,168 | 6,369 | 10,244 | 10,406 |
| Apr. | 2,853 | 4,735 | 4,259 | 3,051 | 4,342 | 4,453 | 6,189 | 10,585 | 10,170 |
| May | 5,189 | 4,359 | 3,892 | 5,180 | 4,902 | 3,451 | 6,760 | 10,043 | 10,615 |
| June | 5,448 | 4,097 | 3,480 | 5,778 | 5,309 | 4,024 | 6,097 | 8,795 | 10,050 |
| July | 5,603 | 3,531 | 3,251 | 5,211 | 4,323 | 5,269 | 6,440 | 8,053 | 8,005 |
| Aug. | 4,916 | 3,680 | 3,894 | 4,687 | 4,198 | 4,556 | 6,628 | 7,555 | 6,939 |
| Sept. | 3,827 | 3,110 | | 3,472 | 3,024 | | 7,008 | 7,639 | |
| Oct. | 3,506 | 3,219 | | 2,676 | 2,689 | | 7,831 | 8,151 | |
| Nov. | 2,863 | 3,169 | | 2,103 | 2,767 | | 8,625 | 8,503 | |
| Dec. | 2,631 | 3,503 | | 3,410 | 2,850 | | 7,815 | 9,180 | |

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

# Automobile Production

| | United States Total | United States Passenger Cars | United States Trucks | Canada Total | Canada Passenger Cars | Canada Trucks | Grand Total |
|---|---|---|---|---|---|---|---|
| 1928 | 4,357,384 | 3,826,613 | 530,771 | 242,382 | 196,737 | 45,645 | 4,599,944 |
| 1929 | 5,358,420 | 4,587,400 | 771,020 | 263,295 | 207,498 | 55,797 | 5,621,715 |
| 1930 | 3,355,986 | 2,814,452 | 540,534 | 154,192 | 125,442 | 28,750 | 3,510,178 |
| 1931 | 2,389,730 | 1,973,090 | 416,640 | 82,621 | 63,477 | 19,144 | 2,472,351 |
| 1932 | 1,370,678 | 1,135,493 | 235,187 | 60,816 | 50,718 | 10,098 | 1,431,494 |
| 1933* | 1,920,057 | 1,573,512 | 346,545 | 65,924 | 53,855 | 12,069 | 1,992,126 |
| 1934 | 2,778,739 | 2,190,099 | 588,640 | 116,890 | 92,538 | 24,352 | 2,895,629 |
| 1934 | | | | | | | |
| Sept.* | 168,871 | 123,909 | 44,962 | 5,579 | 4,211 | 1,368 | 174,450 |
| Oct.* | 132,491 | 84,503 | 47,988 | 3,780 | 2,125 | 1,655 | 136,271 |
| Nov.* | 78,465 | 45,556 | 32,909 | 1,697 | 1,052 | 645 | 80,162 |
| Dec. | 183,187 | 128,059 | 55,128 | 2,732 | 2,334 | 398 | 185,919 |
| 1935 | | | | | | | |
| Jan.* | 292,817 | 229,233 | 63,584 | 10,607 | 8,269 | 2,338 | 303,424 |
| Feb.* | 335,699 | 275,623 | 60,076 | 18,114 | 13,885 | 4,229 | 353,813 |
| March* | 429,834 | 361,816 | 68,018 | 21,975 | 18,179 | 3,796 | 451,809 |
| April* | 477,746 | 401,628 | 76,118 | 24,121 | 20,686 | 3,435 | 501,867 |
| May* | 364,727 | 307,522 | 57,205 | 20,765 | 17,093 | 3,672 | 385,492 |
| June* | 361,321 | 296,609 | 64,712 | 15,745 | 12,276 | 3,469 | 377,066 |
| July* | 337,044 | 276,084 | 60,960 | 13,069 | 9,471 | 3,598 | 350,113 |
| Aug. | 240,051 | 182,389 | 57,662 | 7,692 | 5,524 | 2,168 | 247,743 |
| Sept. | 89,805 | 57,285 | 32,520 | 5,323 | 3,819 | 1,504 | 95,128 |

* Revised.

# Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

| | BRITISH MALAYA [1] | | | | | | | | DUTCH EAST INDIES [8] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Exports | Imports | Gross Exports Minus Imports | Ceylon [2] | India & Burma [3] | Sarawak [4] | British North Borneo [5] | Siam [6] | Java & Madura | Sumatra E. Coast | Other D.E.I. | Indo-China [5] | Amazon Valley | All Other [6] | World Total [7] |
| 1923 | 252,016 | 70,432 | 181,584 | 39,971 | 6,416 | 5,705 | 4,237 | 1,718 | 32,930 | 46,344 | 57,822 | 5,067 | 16,765 | 7,856 | 406,415 |
| 1924 | 259,706 | 108,524 | 151,182 | 39,997 | 7,657 | 6,699 | 4,621 | 2,962 | 42,446 | 54,497 | 80,347 | 6,688 | 23,165 | 9,065 | 429,366 |
| 1925 | 316,825 | 158,022 | 158,803 | 49,566 | 10,082 | 5,424 | 5,377 | 5,377 | 46,757 | 65,499 | 120,626 | 7,881 | 25,298 | 13,797 | 514,487 |
| 1926 | 391,328 | 151,243 | 240,085 | 58,962 | 9,874 | 9,155 | 6,079 | 4,027 | 52,186 | 71,413 | 121,231 | 8,203 | 24,298 | 16,017 | 621,530 |
| 1927 | 371,322 | 182,845 | 188,477 | 55,356 | 11,321 | 10,923 | 6,562 | 5,472 | 55,297 | 77,815 | 142,171 | 8,645 | 28,782 | 15,633 | 606,474 |
| 1928 | 409,430 | 149,787 | 259,643 | 57,267 | 10,790 | 10,087 | 6,698 | 4,813 | 58,848 | 82,511 | 121,770 | 9,548 | 21,129 | 10,690 | 653,794 |
| 1929 | 574,836 | 163,092 | 411,744 | 81,584 | 11,663 | 11,077 | 7,381 | 5,018 | 65,990 | 87,789 | 134,037 | 9,696 | 21,148 | 6,767 | 853,894 |
| 1930 | 547,043 | 133,876 | 413,167 | 76,970 | 10,782 | 10,309 | 6,781 | 4,251 | 69,755 | 79,396 | 115,254 | 7,665 | 14,260 | 5,651 | 814,241 |
| 1931 | 519,740 | 125,506 | 394,234 | 61,769 | 8,470 | 10,451 | 6,247 | 4,218 | 75,952 | 87,747 | 116,009 | 11,696 | 12,121 | 3,294 | 792,203 |
| 1932 | 478,252 | 92,539 | 385,713 | 48,973 | 3,888 | 6,960 | 4,664 | 3,451 | 61,312 | 79,837 | 85,871 | 13,883 | 6,450 | 1,816 | 702,818 |
| 1933 | 573,412 | 167,377 | 406,035 | 63,351 | 4,527 | 10,874 | 7,555 | 7,765 | 73,851 | 91,861 | 149,659 | 18,394 | 9,883 | 2,737 | 846,312 |
| 1933: | | | | | | | | | | | | | | | |
| Sept. | 49,607 | 15,146 | 34,461 | 5,111 | 125 | 1,027 | 727 | 611 | 5,868 | 9,164 | 15,005 | 1,702 | 656 | 274 | 74,731 |
| Oct. | 61,002 | 17,390 | 43,612 | 5,674 | 271 | 959 | 750 | 979 | 6,329 | 8,682 | 15,170 | 1,426 | 965 | 314 | 85,131 |
| Nov. | 54,599 | 20,142 | 34,457 | 6,097 | 516 | 1,020 | 750 | 1,303 | 6,684 | 9,951 | 14,474 | 1,553 | 956 | 366 | 78,127 |
| Dec. | 57,579 | 18,110 | 39,469 | 7,435 | 964 | 989 | 750 | 1,046 | 7,030 | 10,183 | 17,274 | 3,779 | 930 | 302 | 90,151 |
| 1934: | | | | | | | | | | | | | | | |
| Jan. | 55,055 | 16,128 | 38,927 | 6,929 | 1,531 | 1,197 | 805 | 1,290 | 6,513 | 7,975 | 13,913 | 1,109 | 576 | 127 | 80,892 |
| Feb. | 57,867 | 15,027 | 42,840 | 8,620 | 775 | 1,005 | 805 | 1,264 | 6,706 | 9,211 | 13,696 | 1,232 | 831 | 105 | 87,090 |
| March | 58,515 | 19,907 | 38,608 | 6,750 | 1,412 | 1,360 | 806 | 1,363 | 8,655 | 10,539 | 19,084 | 1,968 | 846 | 113 | 91,504 |
| April | 56,748 | 20,957 | 35,791 | 5,157 | 762 | 1,447 | 894 | 1,311 | 7,282 | 9,808 | 19,250 | 1,330 | 440 | 236 | 83,708 |
| May | 69,403 | 25,691 | 43,712 | 8,870 | 1,106 | 1,892 | 1,397 | 997 | 12,104 | 14,606 | 26,598 | 1,243 | 726 | 328 | 113,579 |
| June | 53,282 | 20,981 | 32,301 | 5,397 | 1,425 | 1,886 | 644 | 1,497 | 4,860 | 6,192 | 15,956 | 1,593 | 765 | 377 | 72,893 |
| July | 53,335 | 22,829 | 30,506 | 3,818 | 710 | 1,662 | 1,048 | 2,399 | 5,762 | 7,369 | 14,415 | 1,703 | 353 | 252 | 69,997 |
| Aug. | 52,641 | 17,865 | 34,776 | 4,948 | 552 | 1,714 | 1,048 | 1,908 | 5,340 | 8,901 | 11,356 | 1,610 | 710 | 251 | 73,114 |
| Sept. | 61,051 | 17,889 | 43,162 | 6,555 | 294 | 1,438 | 839 | 1,626 | 5,722 | 10,738 | 14,688 | 1,665 | 764 | 222 | 87,713 |
| Oct. | 47,045 | 10,226 | 36,819 | 6,544 | 413 | 1,412 | 1,196 | 1,328 | 5,970 | 6,643 | 5,556 | 1,413 | 840 | 401 | 68,535 |
| Nov. | 51,140 | 8,759 | 42,381 | 6,756 | 501 | 953 | 941 | 1,356 | 7,621 | 7,123 | 5,338 | 2,356 | 1,017 | 334 | 76,676 |
| Dec. | 59,575 | 15,375 | 44,200 | 8,481 | 990 | 1,237 | 680 | 2,043 | 10,865 | 12,953 | 12,354 | 2,956 | 1,035 | 239 | 98,033 |
| 1935 | | | | | | | | | | | | | | | |
| Jan. | 56,720 | 17,142 | 39,578 | 5,202 | 2,269 | 1,630 | 1,222 | 2,614 | 3,812 | 5,371 | 8,704 | 2,650 | 1,196 | 460 | 74,719 |
| Feb. | 50,593 | 17,676 | 32,917 | 5,556 | 731 | 1,887 | 760 | 2,288 | 4,395 | 7,663 | 15,194 | 2,076 | 636 | 254 | 74,154 |
| Mar. | 47,407 | 13,437 | 33,970 | 3,181 | 701 | 1,901 | 773 | 2,076 | 5,592 | 7,950 | 7,973 | 1,472 | 740 | 526 | 66,855 |
| Apr. | 53,360 | 16,029 | 37,331 | 2,976 | 370 | 1,895 | 846 | 1,661 | 5,574 | 6,873 | 12,683 | 2,827 | 963 | 185 | 74,957 |
| May | 51,353 | 23,720 | 27,633 | 4,223 | 674 | 2,323 | 848 | 2,752 | 6,217 | 7,931 | 21,058 | 2,138 | 832 | 315 | 76,920 |
| June | 49,751 | 18,637 | 31,114 | 3,525 | 1,077 | 2,031 | 603 | 2,869 | 5,698 | 8,258 | 14,168 | 2,021 | 659 | 300* | 72,323 |
| July | 48,975 | 11,257 | 37,718 | 4,106 | 580 | 1,870 | 1,164 | 1,939 | 5,899 | 5,664 | 8,373 | 2,015 | 427 | 300* | 70,055 |
| Aug. | 51,873 | 10,978 | 40,895 | 5,683 | 724 | 759 | 566 | 2,062 | 4,661 | 6,923 | 8,875 | 2,451 | 1,150 | 300* | 74,399 |
| Sept. | 51,247 | 10,418 | 40,829 | 3,970 | 681 | 1,797 | 421 | 2,278 | | | | 2,248 | 1,200* | 300* | |
| Oct. | 48,258 | 19,364 | 28,894 | 5,932 | | | | | | | | | | | |

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional: final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

# Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

| | United States [1] | United Kingdom | France (h) | Germany | Canada (ac) | Japan (da) | Italy | Russia (ce) | Australia (cd) | Belgium (d) | Netherlands | Scandinavia (abcdf) | Spain (g) | Czechoslovakia (abcd) | World Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1919 | 238,407 | 42,671 | 17,685 | 5,584 | 6,395 | 9,753 | 9,894 | 75 | 1,002 | 3,995 | 2,771 | 3,149 | 2,418 | 9 | 343,808 |
| 1920 | 249,530 | 56,844 | 13,885 | 11,890 | 11,746 | 5,297 | 6,123 | 62 | 1,815 | 3,840 | 5,510 | 2,292 | 2,008 | 567 | 371,409 |
| 1921 | 179,736 | 42,087 | 15,135 | 21,920 | 8,124 | 21,713 | 3,906 | 165 | 1,014 | 1,705 | 1,022 | 1,279 | 2,245 | 569 | 300,620 |
| 1922 | 296,594 | 11,724 | 24,352 | 27,546 | 9,207 | 15,934 | 6,430 | 2,493 | 2,643 | 172 | —3,807 | 1,778 | 589 | 567 | 396,222 |
| 1923 | 301,527 | 12,700 | 27,392 | 18,519 | 13,277 | 15,372 | 8,489 | 2,986 | 1,649 | 2,184 | 792 | 2,528 | 630 | 1,128 | 409,173 |
| 1924 | 319,103 | —11,550 | 30,446 | 22,727 | 14,299 | 19,571 | 8,764 | 2,346 | 3,124 | 2,688 | —807 | 3,178 | 944 | 1,370 | 416,203 |
| 1925 | 385,596 | 4,061 | 32,956 | 33,937 | 19,683 | 11,117 | 11,412 | 7,088 | 4,757 | 2,930 | 875 | 3,149 | 1,155 | 1,558 | 520,274 |
| 1926 | 399,981 | 84,865 | 34,240 | 22,775 | 20,229 | 18,125 | 9,809 | 6,529 | 9,021 | 2,498 | 2,670 | 4,046 | 1,299 | 1,870 | 617,957 |
| 1927 | 403,472 | 60,249 | 34,271 | 38,892 | 26,405 | 20,521 | 11,381 | 12,018 | 9,490 | 6,482 | 636 | 4,224 | 2,055 | 2,672 | 632,768 |
| 1928 | 407,572 | 4,846 | 36,498 | 37,855 | 30,447 | 25,621 | 12,433 | 15,134 | 8,430 | 7,958 | 2,243 | 4,418 | 3,178 | 3,138 | 599,771 |
| 1929 | 528,608 | 122,675 | 55,093 | 49,275 | 35,453 | 34,284 | 17,169 | 11,774 | 15,886 | 9,445 | 3,022 | 6,440 | 864 | 4,650 | 894,638 |
| 1930 | 458,036 | 120,069 | 68,503 | 45,488 | 28,793 | 33,039 | 18,639 | 16,387 | 5,354 | 10,635 | 2,924 | 7,710 | 2,400 | 4,468 | 822,445 |
| 1931 | 475,993 | 86,170 | 46,466 | 39,688 | 25,261 | 43,483 | 10,149 | 30,671 | 7,649 | 11,009 | 2,220 | 6,360 | 2,605 | 7,717 | 794,041 |
| 1932 | 393,844 | 44,086 | 42,506 | 45,121 | 20,917 | 56,027 | 14,469 | 30,637 | 12,576 | 9,519 | 2,851 | 7,262 | 4,359 | 9,444 | 693,618 |
| 1933 | 398,365 | 73,335 | 61,953 | 54,120 | 19,332 | 66,831 | 19,341 | 29,830 | 13,534 | 11,166 | 1,243 | 7,831 | 5,520 | 10,402 | 772,803 |
| 1934: | | | | | | | | | | | | | | | |
| Feb. | 33,087 | 10,785 | 5,301 | 5,490 | 1,854 | 4,570 | 2,388 | 3,399 | 950 | 1,538 | 287 | 464 | 656 | 516 | 73,357 |
| Mar. | 39,306 | 14,008 | 4,980 | 6,453 | 3,411 | 5,655 | 1,394 | 4,018 | 671 | 965 | 284 | 836 | 394 | 976 | 86,242 |
| Apr. | 42,262 | 9,999 | 3,210 | 6,701 | 2,419 | 5,679 | 1,966 | 1,326 | 415 | 504 | 262 | 1,217 | 752 | 465 | 77,177 |
| May | 47,412 | 9,786 | 3,634 | 6,499 | 2,218 | 6,905 | 2,218 | 4,360 | 769 | 214 | 322 | 940 | 142 | 1,768 | 87,192 |
| June | 46,785 | 16,564 | 3,803 | 6,171 | 2,208 | 6,745 | 1,887 | 3,145 | 1,512 | 837 | 331 | 843 | 1,146 | 1,624 | 93,601 |
| July | 40,308 | 12,266 | 4,051 | 5,494 | 2,430 | 5,739 | 708 | 1,640 | 732 | 810 | 540 | 1,602 | 747 | 1,094 | 78,161 |
| Aug. | 31,405 | 13,728 | 3,660 | 3,078 | 1,948 | 4,945 | 1,795 | 6,829 | 658 | 669 | 239 | 1,033 | 277 | 1,495 | 71,759 |
| Sept. | 30,345 | 11,254 | 4,244 | 2,607 | 2,770 | 7,346 | 1,486 | 4,487 | 743 | 501 | 339 | 980 | 465 | 477 | 68,044 |
| Oct. | 27,323 | 18,897 | 3,424 | 2,148 | 3,043 | 7,227 | 1,296 | 3,681 | 798 | 693 | 447 | 813 | 675 | 254 | 70,719 |
| Nov. | 35,982 | 15,875 | 3,176 | 3,425 | 1,568 | 5,580 | 1,764 | 4,488 | 516 | 379 | 187 | 1,382 | 542 | 215 | 75,079 |
| Dec. | 17,305 | 15,816 | 3,605 | 5,207 | 2,849 | 3,904 | 1,979 | 6,460 | 1,312 | —168 | 139 | 1,143 | 615 | 762 | 60,928 |
| 1935 | | | | | | | | | | | | | | | |
| Jan. | 39,546 | 20,383 | 5,573 | 4,286 | 2,670 | 4,400 | 1,613 | 3,446 | 1,099 | 419 | 158 | 1,252 | 468 | 1,245 | 86,558 |
| Feb. | 45,999 | 15,609 | 4,593 | 3,513 | 1,558 | 5,582 | 4,356 | 1,810 | 848 | 399 | 477 | 838 | 567 | 1,836 | 87,985 |
| Mar. | 44,772 | 12,810 | 4,017 | 6,353 | 2,710 | 4,421 | 1,582 | 4,624 | 1,459 | 240 | 331 | 891 | 630 | 741 | 85,581 |
| Apr. | 40,061 | 11,574 | 3,306 | 5,820 | 1,063 | 6,635 | 1,653 | 3,387 | 1,150 | 520 | 329 | 1,049 | 432 | 789 | 78,115 |
| May | 29,962 | 12,498 | 3,828 | 6,049 | 3,929 | 5,429 | 935 | 1,937 | 671 | 982 | 272 | 853 | 815 | 774 | 68,934 |
| June | 31,410 | 10,253 | 3,210 | 4,551 | 1,435 | 3,373 | 1,831 | 3,087 | 496 | 1,065 | 446 | 780 | 745 | 604 | 66,286 |
| July | 47,694 | 9,454 | 3,247 | 4,929 | 1,319 | 4,484 | 1,298 | 1,823 | 520 | 572 | 157 | 800 | 548 | 185 | 77,030 |
| Aug. | 41,057 | 14,120 | 4,508 | 4,790 | 2,814 | 4,453 | 916 | 1,227 | 655 | 528 | 413 | 820 | | 673 | |
| Sept. | 35,256 | 11,223 | 3,740 | 5,453 | 1,604 | | | | | | | | | | |

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

# The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

## Chemicals and Compounding Materials

**ACCELERATORS—**
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
**ANTIOXIDANTS** — Flectol A, Oxynone
The RUBBER SERVICE Laboratories Co.
1012 Second National Bldg., Akron, Ohio
A Division of MONSANTO Chemical Wks.

**ALUMINUM FLAKE**
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 25 years.*
The Aluminum Flake Co.
Akron, Ohio

**ANTIMONY** Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

**ASBESTINE**—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

**CADMIUM REDS**
In 6 Shades . . Deep Orange to Extra Dark Red
**LITHOPONES**
Standard and Titanated
United Color and Pigment Co., Inc.
Newark, New Jersey
Branches in Principal Cities

**CALCENE**—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
The Columbia Alkali Corporation
BARBERTON, OHIO

**CARBON BLACK**—*Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

THE RUBBER AGE
250 West 57th St., New York

**CABOT CERTIFIED CARBON BLACK**
*"Spheron"*
Godfrey L. Cabot, Inc.
77 Franklin St. Boston, Mass.

**CARBON BLACK**—*Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

**CARBON BLACK**
SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

**CARBON BLACK**
DISPERSO . . . *the specially developed Carbon Black that gives* BETTER DISPERSION.
WISHNICK-TUMPEER, INC.
295 Madison Ave., New York

**CATALPO**—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street, New York City

**CHEMICALS**

| For Rubber | For Industry Generally | |
|---|---|---|
| *Accelerators* | *Acids* | *Latex* |
| *Antioxidants* | *Oil of Myrbane* | *Lotol* |
| *Specialties* | *Aniline Oil* | *Dispersions* |

NAUGATUCK CHEMICAL
Div. of U. S. Rubber Products, Inc.
1790 BROADWAY NEW YORK

**CHEMICALS** and compounding ingredients; Clay, Accelerators, Mineral Rubber.
R. T. Vanderbilt Co.
230 Park Ave. New York City

**CHEMICALS** and Mineral Ingredients—Whiting, Clay, Talc, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

**COLLOIDAL SULPHUR**
**COLLOIDAL ZINC OXIDE**
**COLLOIDAL COLORS**
Heveatex Corporation
78 Goodyear Ave., Malrose, Mass.
*Offices in New York, Akron, Chicago*

**COLORS**—*for Rubber*
Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
Ansbacher-Siegle Corporation
Rosebank, Staten Island, N. Y.
320 So. Clinton St., Chicago, Ill.
*Agents in Principal Cities*

**COLORS**
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST For All Cures
The RUBBER SERVICE LABORATORIES CO.
1012 Second National Building
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